**Faculty of Science Course Syllabus**
**Department of Chemistry**
**CHEM2402: Introductory Organic Chemistry II**
**Term: Winter 2024**
**Format: In-person Lecture and Lab**
**Date: January 8, 2024**

*Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.*
*Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.*

| | |
|---|---|
| **Lecture Instructors:** | **Professor Frances Cozens** Email: CHEM2400@dal.ca. Principal Instructor for CHEM2402 Winter 2024 and is responsible for the lectures and overall CHEM2402 oversight. Office Hours Mon/Wed/Fri from 10:30 - 11:30 am room 410 Chemistry Building, or by appointment in person or via Teams. You are welcome to e-mail Dr. Cozens if you would like to make an appointment for a specific time.<br><br>**Dr. Erin Welsh** Email: Erin.Welsh@dal.ca. CHEM2402 lecture help sessions, tutorials and student lecture support. Room 408 Chemistry. *Tutorial help times TBD.* |
| **Laboratory Instructors:** | **Ms. Gaia Aish** Email: ochemlab@dal.ca. Laboratory coordinator and is responsible for the oversight of all labs. Instructor, day-to-day supervision for the CHEM2402 laboratories. Room 106 Chemistry. Office Hours Tue/Thru 2:00 – 3:00 pm, Fri 12:00 – 1:00 pm room 106 Chemistry Building.<br><br>**Mr. Ryan Snitynsky** Email: ochemlab@dal.ca. Laboratory Instructor, day-to-day supervision for the CHEM2402 laboratories. Room 111 Chemistry.<br><br>**Ms. Maria Coull** Email: ochemlab@dal.ca. Laboratory Instructor, day-to-day supervision for the CHEM2402 laboratories. Room 112 Chemistry. |
| **Lectures Location:** | Potter Auditorium, KENNETH C ROWE Management Building - Room 1028 (6100 Univ. Ave.); M/W/F 9:35-10:25 am; three hours per week |
| **Laboratories Location:** | Sproull Organic Chemistry Laboratory - Room 121-125P, once per week, for three hours; starting on Monday, January 22, 2024, and ending on Friday, April 5, 2024. |

The following pages constitute the syllabus for this course, CHEM2402. You can consider the syllabus to be a contract, which delineates responsibilities and expectations for both the students and the teaching team. You should review the syllabus, refer to it as necessary throughout the term, and contact the Principal Instructor at CHEM2400@dal.ca with any questions and/or concerns you may have. In order to complete CHEM2402 satisfactorily, a student must fulfil all the requirements as set down in this course syllabus.

## Course Description:

CHEM2402 builds strongly on the information obtained in CHEM2401 and focuses on the properties and reactions of alcohols, ethers, amines, nitriles, imines, the carbonyl-containing functional groups and aromatic compounds, along with spectroscopy in the laboratory. The reactions learned are also used in synthetic sequences that increase in complexity through the term. Writing out full reaction mechanisms is an important aspect of CHEM2402.

Multi-step synthetic sequences are developed and are an integral part of the course. Organic reactions, organic reaction mechanisms and organic multi-step reactions are the main features of CHEM2402. The concepts of resonance and aromaticity are investigated and infrared (IR) spectroscopy is introduced in the laboratory. IR and NMR spectroscopies are utilized in the laboratory for compound identification but will not be a significant component of the lecture material.

## Course Format:

In-person lectures and labs. The majority of components in the class will be conducted in-person; this includes lectures, labs, midterm 2 and the final examination. No additional online lectures will be available for CHEM2402 except those special topics posted to Brightspace. No live video capture will be available for CHEM2402 lectures. Attendance to lectures is important for completing the course successfully. You must not have conflicts during the lecture times to take CHEM2402.

## Course Prerequisites:

CHEM2401.03 (**grade of C+ or better or permission from the instructor**). CHEM2401 is the prerequisite for CHEM2402. Students who have not obtained a grade of C+ or better, or an equivalent class from another institution, cannot take CHEM2402 **unless permission is granted**. This requirement is to ensure students have sufficient understanding of the concepts taught in CHEM2401 to be successful in CHEM2402. It is assumed that students have a good grasp of the material in CHEM2401 and have a good understanding of the specific reactions covered, as these concepts are the foundation for CHEM2402. Please note *material including but not limited to the reactions from CHEM2401 is required to be successful in CHEM2402 and may be present on any assessment or the final examination in CHEM2402. This also includes stereochemistry.* Students need to fully grasp the concepts and reactions in CHEM2401 before entering CHEM2402.

## Course Prerequisite knowledge and skills:

Students are expected to have and understanding of all aspects of the material contained in CHEM2401, CHEM1011 and CHEM1012 (or equivalents). Incoming students must have a strong level of understanding of organic chemistry, including bonding, electronegativity, hybridization, double and triple bonds, reaction curved arrows, $S_N1$ $S_N2$, E1 and E2 reactions along with addition reactions of alkenes and alkynes. A willingness to study and engage in the material will be strong assets for the completion of CHEM2402. Review material has been posted to Brightspace.

## Course ill Policy:

If a student experiences significant illness or extreme personal issues during the academic term, a grade of 'ILL' can be requested by the student to the principal class instructor in writing with documentation. A grade of ILL will only be considered if the final examination in CHEM2402 is not written. Once the final examination is written a grade of ILL is no longer a possible consideration.

## Course Copyright Policy:

All material posted online for CHEM2402 is strictly copyrighted. No class material can be distributed in any way to a third party. Upon investigation via University protocols if a student is found to have participated in the **uploading of any material to a third party such as CHEGG.COM** or sharing with anyone not enrolled in the class this will lead to a **mark of 'F' for CHEM2402**. Please do not upload any portion of CHEM2402 to CHEGG.COM or any other online class distribution website.

## Course Policies Related to Academic Integrity:

All graded work in CHEM2402 (class and laboratory material) must be done independently by each student enrolled in the class. All resources can be used for the assignments and online assessments in CHEM2402, except 'cheating' websites such as CHEGG.COM. In-person assessments will be 'closed book' with no aids allowed. The CHEM2402 quizzes have been developed to help enhance your learning outcomes. Working on these quizzes independently and thoroughly will help with your overall success in CHEM2402. The assignments in the class will be utilized to help you practice answering relevant problems in organic chemistry. The first midterm test will be an online assessment and the second midterm test will be held in-person. Independent work is required for the fulfillment of CHEM2402. All work must be the student's independent and individually prepared work. Student work that is not independently done will receive a **mark of 0 on the submitted material**.

## Course Accommodation Policy:

Students may request accommodation as a result of barriers experienced related to disability, religious obligation, or any characteristic protected under Canadian human rights legislation.

Students who require academic accommodation for either classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Center (AASC) prior to or at the outset of the regular academic year. Please visit http://www.dal.ca/access for more information and to obtain the Request for Accommodation form. All accommodation requests for CHEM2402 must go through the accessibility centre by each individual student. Only individual student accommodations will be considered that have proper designation from the accessibility center.

A note taker may be required as part of a student's accommodation. There is an honorarium of $75/course/term (with some exceptions). If you are interested, please contact AASC at 494- 2836 for more information or send an email to notetaking@dal.ca

## How to do well in CHEM2402:

There is no doubt that CHEM2402 includes a lot of material to work through and learn. All of the information necessary to be successful in CHEM2402 will be uploaded to Brightspace. CHEM2402 is a course that requires discipline and considerable studying to do well. Studying and keeping up with the material is key for a successful outcome. It is essential to a successful outcome that the Brightspace quizzes, assignments and practice problems are thoroughly worked through.

## Organic Tutorials and help sessions:

Organic Chemistry tutorials will be held throughout the term. Times, location, and dates to be announced via Brightspace.

## Cancelled Classes:

In the case of a weather-related closure of the University, a DalAlert email will be sent to all students, faculty and staff. Other information can be found at www.dal.ca/storm.html. In the event that CHEM2402 needs to be cancelled, notification will be sent by email to the class list.

## Student Health and Wellness:

Taking care of your health is important. As a Dalhousie student, you have access to a wide range of resources to support your health and wellbeing. Students looking to access physical or mental health and wellness services at Dalhousie in Halifax can go to the Student Health & Wellness Centre in the LeMarchant Building. In Truro, physical or mental health and wellness services are available at Health Services in the Dairy Building (Student Success Centre). The teams include: registered nurses, doctors, counsellors and a social worker. Visit dal.ca/studenthealth to learn more and book an appointment today. Students also have access to a variety of online mental health resources, including telephone/texting counselling and workshops/training programs. Learn more and access these resources at dal.ca/mentalhealth.

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## Course Contents:

The sections of the 8th Edition of the textbook that are covered in CHEM2402 have been posted to Brightspace. Note: this list is subject to change and additional updates may be posted during the term.

**Lectures Content:** The following topics are expected to be covered in CHEM2402

- **Nomenclature.** Review the material from CHEM2401. Synopses on drawing organic molecules and nomenclature are now available on the Brightspace site. You should review this material.
- **Review of Organic fundamentals and $S_N1$, $S_N2$, E1 and E2 reactions.** Chapters 1, 2, 3, 4 and 9. Online lecture material.
- **Review of Alkenes and alkynes.** Chapters 5, 6 and 7. Online lecture material.
- **Alcohols and ethers.** Chapter 10.
- **Organocuprates.** Chapter 11.
- **Carboxylic Acids and Derivatives.** Chapter 15.
- **Aldehydes and Ketones.** Chapter 16.
- **Imines and Enamines.** Chapter 16.
- **Reactions of Aromatics.** Chapters 8 and 18.
- **Developing Organic Synthesis.** Chapter 18.
- **Laboratory Spectroscopy.** Review the material on nuclear magnetic resonance ($^1$H and $^{13}$C NMR) spectroscopy from CHEM2401. Chapters 13, and 14. To learn the infrared (IR) spectroscopy fundamentals read the material "Introduction to Infrared Spectroscopy. Structural Elucidation" which will be posted in the lab section of the class on Brightspace.

## Course Objectives/Learning Outcomes:

Students completing this course, will be able to:

- work safely in the organic chemistry laboratory and carry out synthetic reactions. This includes set-up and work-up, recrystallization, thin-layer chromatography, filtration, extraction, reflux and distillation
- interpret spectra; propose reasonable structures primarily via $^1$H and $^{13}$C NMR spectra
- interpret fundamental laboratory results related to organic chemistry and write scientific passages
- use IUPAC rules to draw and name organic compounds
- draw and interpret proper Lewis structures, including comprehension of contributing resonance structures
- use reactions from CHEM2402 in the development of synthetic schemes
- use curved/curly arrows to depict reactions
- use mechanisms to propose reaction coordinate diagrams
- write out curved arrow-pushing mechanisms for the reactions presented
- understand Sn1, Sn2, E1 and E2 reactions and use them in synthetic schemes
- understand reactions of alkenes and alkynes and use them in synthetic schemes
- understand reactions of alcohols, ethers and epoxides and use them in synthetic schemes
- understand reactions of carboxylic acids and their derivatives and use them in synthetic schemes
- understand reactions of aldehydes and ketones and use them in synthetic schemes
- understand reactions of imines and enamines and use them in synthetic schemes
- understand reactions of benzene and other aromatics and use them in synthetic schemes
- understand the difference between a kinetic and thermodynamic controlled reaction
- use arrow pushing mechanisms for a wide variety of reactions
- predict and justify reactivity of organic compounds under a variety of experimental conditions
- write out full mechanisms showing all steps along a reaction pathway for a wide variety of reactions
- use reaction coordinate diagrams to show the progress of a reaction
- propose reaction sequences and conditions for the preparation of simple organic compounds

## Course Materials:

**Lectures:** Class material will be available from Brightspace. Note: Lectures notes are subject to change. The most up-to-date set of lecture notes will be available on Brightspace. Topics 1 and 2 will be provided by video lecture format, all other topics will be delivered in-person only. Students are welcome to audio record the lectures for their private use. No online recordings will be provided (except for topics 1 and 2). Lectures will not be recorded for CHEM2402. No accommodations will be made for students who have scheduling conflicts with other courses.

**Textbook:** The official textbook is: "Organic Chemistry" **8th Edition**, by Paula Y. Bruice. This book is available at the University Bookstore as an ebook. A link to the ebook has been posted to Brightspace with a two-week free trial. In CHEM2402, "Organic Chemistry" by Bruice will be followed and lecture notes are based on the material from this book. The material that will be on the midterm tests and the final examination will be covered in the PowerPoint slides that will be available on Brightspace. Other textbooks are also helpful as different books explain certain concepts better than others but assigned material for this course will be defined in terms of the official textbook.

**Brightspace:** All class material including, class communication via announcements, lecture notes, practice problems and laboratory announcements and information, will be posted to Brightspace https://dal.brightspace.com.All information required for the course is part of the CHEM2402 Brightspace page.

## Course tips for success:

***Attend class.*** There is a clear and direct correlation between skipped lectures and poor results in this course. This cannot be stressed enough! Even though the class notes are provided, the more classes you attend the better you will do! The students that typically excel in CHEM2402 have extremely high attendance to all lectures.

***Brightspace page.*** All resources for CHEM2402 are offered on the class Brightspace page. No supplementary notes are needed. All information is posted on Brightspace at no additional cost to you. Please visit the Brightspace page frequently to keep up with the class material.

***Take good notes***. Taking your own notes will help you to learn. Even though class notes are provided, the more you write your own notes the better you will do.

***Study***. Keep up with the material. It is critical to stay up to date with the material. The material in CHEM2402 cannot be learned the day before the final examination.

***Brightspace quizzes*** Do the quizzes independently and thoroughly; using the quizzes to learn the class material is a great way to enhance your class outcome.

***Take home assignments*** The questions on the take home assignments will be similar to those found on the in-person midterm test and final examination. Doing the assignments completely and carefully is a great way to enhance your class outcome.

***Practice Problems***. Do the problem sets as soon as possible after they appear on the Brightspace and do NOT look at the answers until the problem set is complete. Attend the lecture help tutorials!

## Course Assessments:

**Evaluation Summary:** There will be **six (6)** online quizzes available through Brightspace. These quizzes will be based on the lecture material and scheduled during the term. In addition to the online quizzes, the class will have **4** take home assignments, **two midterm** evaluations both scheduled **to run in the evening**, along with the final examination. One midterm will be given through Brightspace as a Brightspace quiz, and one midterm will be a hand-written exam scheduled to be synchronous and in-person. Both midterms are scheduled for the evenings. Please clear off your calendar for these two evening midterm tests, dates given below. There will be a three-hour in-person final examination to be scheduled via the registrar during the regular exam period. Lastly, there will also be ten weeks of labs to complete during the term.

**Online quizzes:** Six online quizzes will be assigned throughout the term. Each topic will have an associated quiz that must be done within the time allowed for the quiz. Each quiz will be independently graded. The total grade component for the online quizzes will be 10% of the final grade. Each quiz will be open for a minimum of 5 days. All online quizzes must be completed. Release and due dates will be posted to Brightspace throughout the term.

**Assignments:** In CHEM2402, there will be a total of 4 take-home assignments. Each assignment must be completed by hand, without the use of ChemDraw or computer-generated images. Assignments that are not completed by hand will not be assessed and will receive a grade of 0. Paper copies of the assignments will be collected on the specified due date; online or late submissions will not be accepted. Due dates will be posted to Brightspace at the time the assignment is released. A minimum of 5 days will be available for completion of the assignments. Detailed instructions for the take-home assignments will be available on Brightspace. Generally, each assignment will consist of multiple questions, some with multiple parts. However, **only one question on each assignment will be graded**. The graded question will not be announced to students until after the assignment's due date. All questions on the assignment must be completed to receive credit for the graded question. This approach helps manage the marking load in a class with a large enrollment.

The format of these assignments will resemble the practice problems posted on Brightspace, serving as valuable preparation for the midterms and the final examination. Take-home assignments contribute 5% to the overall class grade and will not be returned to students; only the final combined assignment mark will be posted on Brightspace.

**Laboratories:** There will be 10 laboratories in CHEM2402. The total laboratory grade will make up 15% of the final grade in CHEM2402 and will be spread out over the laboratory program. More information on the lab grading scheme can be found in the laboratory manual.

**Midterm 1:** The first is scheduled for **Friday, February 9 between 7:00 – 9:00 pm**. It will be a synchronous online midterm test delivered through Brightspace. **There will be no make-up exam for midterm 1.** If midterm 1 is missed due to illness or other personal issues the percent of the midterm test will be added to the final examination.

**Midterm 2:** The second midterm is scheduled to be in-person on **Wednesday, March 6 between 7:00 – 9:00 pm** to be held in the **Marion McCain Arts and Social Sciences Building Auditorium 1 and Auditorium 2**. **There will be no make-up exam for midterm 2.** If midterm 2 is missed due to illness or other personal issues the percent of the midterm test will be added to the final examination.

**Final Exam:** The final examination (time and place) will be scheduled by the Registrar. The final examination will be a 3-hour exam and will cover the entire course. The final examination may include some questions from the laboratory portion of the course and may include reactions covered in CHEM2401. A student may write a make-up final examination if the final examination was missed with a justifiable, documented reason. A hand-signed SDA must be complete within 24 hours of the final examination date and time. The date and time of the make-up examination will be decided a few days after the CHEM2402 final examination has been written and will be at the end of the regular examination period. **Only one make-up final examination will be offered in CHEM2402 (see the University Regulations, Calendar).** The student is responsible to contact the Principal Instructor at CHEM2400@dal.ca to arrange the make-up final examination in CHEM2402. **The Principal Instructor will not contact the student.** Failure to contact the Principal Instructor prior to the final examination date or **within 24 hours** after the final examination date and to provide appropriate documentation for the missed final examination will result in a grade of 'F for CHEM2402. **CHEM2402 has no supplementary examination.** A student who does not write the final examination will receive a grade of 'F for CHEM2402. The University policy is that final examinations are not returned to students. Final examinations will be retained for 6 months and then securely disposed of. The final examination in CHEM2402 can only be reviewed in-person.

## Final Examination Grading Policy:

A minimum mark of 35.0% must be obtained on the final examination in CHEM2402 to pass the class. Any mark less than 35.0% on the final examination in CHEM2402 will automatically result in a grade of **"F"** in CHEM2402. There will be no exceptions to this requirement. Only students who obtain a grade of 35.0% or better can pass CHEM2402.

Furthermore, please note that if the final examination mark in CHEM2402 is between 35.0% and 39.9.% and the overall calculated mark is above 50% (passing), then a grade of **"D"** will be issued as the final grade in CHEM2402. No other grades will be issued for an overall passing grade in CHEM2402 if the final examination falls between the percentages given above. There will be no exceptions to this requirement.

If the final examination mark in CHEM2402 is above 40.0% the calculated mark as determined by the class components will be used to determine the final grade in CHEM2402. This combined score must be greater than 50.0% to pass CHEM2402.

## Course Grade Calculation:

***A minimum grade of 7.5/15 is required in the laboratory portion*** of CHEM2402 to pass the class.

***A minimum grade of 35.0/100 marks for the final examination is required in*** CHEM2402 to pass the class.

***A minimum grade of 40.0 /100 marks for the final examination is required in*** CHEM2402 to obtain a grade higher than a "D".

***A minimum total grade of 50.0/100 marks for the combined class material is required in*** *CHEM2402 to pass the class*.

| **Course Assessment:** | **Total** |
|---|---|
| **Scheme 1** | |
| Online Quizzes | 10% |
| Take-home assignments | 5% |
| Midterm 1 Online | 15% |
| Midterm 2 In-person | 15% |
| Final examination In-person | 40% |
| Laboratory | 15% |
| **Total** | **100%** |
| | |
| **Scheme 2** | |
| Online Quizzes | 10% |
| Take-home assignments | 5% |
| Midterm 1 Online | 15% |
| Midterm 2 In-person | 0% |
| Final examination In-person | 55% |
| Laboratory | 15% |
| **Total** | **100%** |

**Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale**

| | | | | |
|---|---|---|---|---|
| **A+** (90-100) | **B+** (77-79) | **C+** (65-69) | **D** | (50-54) |
| **A** (85-89) | **B** (73-76) | **C** (60-64) | **F** | (<50) |
| **A-** (80-84) | **B-** (70-72) | **C-** (55-59) | | |

## Laboratory Information:

Laboratory work is an integral part of this class. In order to pass CHEM2402 the lab portion of the class must be completed with a grade of greater than 7.5 out of 15 possible marks. Laboratory activities will be in-person. The lab work will help you to learn and appreciate practical techniques and will help you to understand lecture topics. In the in-person labs, students will learn or expand their laboratory skill set through the preparation, purification and characterization of organic compounds using organic reactions learned in the lecture component. Although they are strongly related, the lectures and the laboratories have a different emphasis in what they teach. Nevertheless, material in the laboratories will complement the information from the lectures, and *vice-versa*. The midterm tests and final examination may include questions from the laboratory part of the course.

The detailed running of the laboratories will be handled by Ms. Gaia Aish, Mr. Ryan Snitynsky and Ms. Maria Coull and they will be assisted by Teaching Assistants (TAs).

The details of assessment in the laboratory can be found in the CHEM2402 Laboratory Manual, Winter 2024. In order to pass CHEM2402, the laboratory part must be passed. Therefore, *attendance at the laboratory sessions is mandatory.* Please see the Lab Completion Policy in the lab manual.

Students should arrive at the laboratory on time and well prepared. Questions concerning how the laboratories are run and about the material covered in the laboratory should be directed to the Laboratory Instructor.

*The first laboratory is on Monday, January 22*. The schedule of experiments is in the laboratory manual and on the Brightspace site.

**In-Person Laboratory:**

- Laboratory experiments and reports will relate to the lecture material during the Winter 2024 term.
- In-person labs will be conducted in the Sproull Organic Chemistry Laboratory
- All work must be independent.
- Students will do these in-person labs in the lab sections they registered for. A detailed schedule for these labs will be posted on Brightspace and can be found in the CHEM2402 Laboratory Manual.
- The lab work will be divided in ten (10) laboratories.
- Each lab will have a lab report. More details on the in-person lab reports can be found in the CHEM2402 Laboratory Manual.

## Laboratory Registration:

E-mail ochemlab@dal.ca as soon as possible if there is a problem regarding your registration. Please state your student number in your e-mail. The laboratories are in Rooms 121–125P of the Chemistry Building ("Sproull Organic Chemistry Laboratory").

## Laboratory Safety:

*Safety is very important.* Failure to comply with safety instructions given by the Instructor and/or a Teaching Assistant will result in expulsion from the laboratory. Approved eye protection and a cotton laboratory coat are required at all times within the laboratory. The CHEM2402 Laboratory Manual *for this academic year* is required, as is a hardcover laboratory notebook.

## Materials Required for In-Person Labs:

- CHEM2402 Laboratory Manual, Winter 2024 **(required)** – available from the Dalhousie bookstore.
- Hardcover laboratory notebook **(required)**
- Safety glasses are **mandatory** (including students with prescription glasses) for CHEM2402 labs; must have CSA-Z94-3 or ANSI Z87 rating.
- Lab Coats 100% cotton and long-sleeved are **mandatory** for CHEM2402 labs. Your lab coat must fit properly and must reach to near the knees. Sleeves must not be rolled up.

## Laboratory Waiver:

A student who is repeating CHEM2402 may be exempt from the laboratory, but a laboratory waiver is not automatic. The student must apply for a waiver at the beginning of the term and must have taken CHEM2402 in the **last academic term**. Apply by e-mail to Ms. Gaia Aish at ochemlab@dal.ca, stating your student number. A waiver may be given at the discretion of Ms. Gaia Aish, who follows these guidelines:

i. Lab exemptions are only valid until the end of the academic year following that in which laboratory credit was granted.
ii. The laboratory mark must have been at least 60%.
iii. The overall mark for the course must have been 40%, or better. A student with a laboratory waiver will receive the in-person laboratory mark that was awarded in the most recent attempt for their final grade calculation.

## Chemistry Safety Module:

All student taking in-person labs in Department of Chemistry at Dalhousie are required to complete this online module on LON-CAPA. Successful completion of the Safety Module includes reading the General Safety Statement presented below and obtaining a perfect mark on five online safety quizzes (25/25). After the completion of these requirements, you should feel comfortable working in a chemistry laboratory and have the tools you need to promote a safe laboratory environment. The General Safety Statement can be found in this section of the lab manual and on Brightspace, the information contained should be used to complete your Safety Module Quiz found at: capa.conceptsinchemistry.ca. The deadline for completion of the Chemistry Safety Module is **January 14, 2024, 11:30 pm**. If you are taking multiple chemistry laboratory classes, then you only need to successfully complete the quizzes once per academic year. If you completed this module during this academic year, you don't need to do it again.

## 2015 Workplace Hazardous Materials Information System (WHMIS) training:

All students must complete the 2015 WHMIS training (provided through the Dalhousie College of Continuing Education) and upload proof of completion. Students who completed the module in the 2022 Fall term or within the last three (3) years do not need to redo it this term, they simply will upload proof of completion to Brightspace. The deadline for this requirement is **January 21, 2024, 11:30 pm**.

## CHEM2402 is governed by Dalhousie University's Code of Student Conduct.

## Laboratory schedule:

| Week of | Location | Lab Experience | Due Dates | |
|---|---|---|---|---|
| | | | **Report Sheets** **In lab** the week of: | **Assessment Details** |
| Jan 8 | | | | |
| Jan 15 | | | | WHMIS due |
| Jan 22 | In-person | **Lab 1**. Nucleophilic Substitution (3 hours) | online Feb 1, 11:59 pm | Online report submission |
| Jan 29 (Munro Day, Feb 2) | Asynchronous | **Lab 2**. Structural Elucidation (3 hours) (MU Lab 1) | Feb 5 | |
| Lab 1 Completion Deadline: February 1st | | | | |
| Feb 5 | In-person | **Lab 3**. Reduction (Benzhydrol) (3 hours) | Feb 12 | Sample 1 |
| Feb 12 | In-person | **Lab 4**. Oxidation (Cyclohexanone) (3 hours) | Feb 26 | Sample 2 |
| Feb 19 | | Reading Week | none | |
| Feb 26 | In-person | **Lab 5**. Grignard Synthesis (3 hours) | Mar 4 | |
| Mar 4 | In-person | **Lab 6**. Grignard Analysis (3 hours) | Mar 11 | Sample 3 |
| Mar 11 | In-person | **Lab 7**. Fischer Esterification (3 hours) | Mar 18 | Sample 4 |
| Mar 18 | In-person | **Lab 8**. ID an unknown (Part 1) (3 hours) | During lab 8 (same day) | |
| Mar 25 (Good Friday, Mar 29) | Asynchronous | **Lab 9**. ID an unknown (Part 2) (3 hours) (MU labs 3, 4, 5, 6, 7, 8) | Online April 1st, 11:59 pm | Online report submission Only online |
| Lab 3-8 Completion Deadline: March 28th | | | | |
| Apr 1 | In-person | **Lab 10**. EAS (3 hours) | During lab 10 (same day) | Sample 5 locker checkout |
| Apr 8 | No new lab tasks | (MU lab 10) | | |
| Lab 10 Completion Deadline: April 9th (last class is April 9th) | | | | |

*The laboratory timetable may be adjusted due to university closure.*
*Changes will be posted to Brightspace.*

# University Policies and Statements

**Recognition of Mi'kmaq Territory**
Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

**Internationalization**
At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: https://www.dal.ca/about-dal/internationalization.html

**Academic Integrity**
At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

**Accessibility**
The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html)

**Conduct in the Classroom – Culture of Respect**
Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

**Diversity and Inclusion – Culture of Respect**
Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: http://www.dal.ca/cultureofrespect.html

**Student Code of Conduct**
Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

**Fair Dealing Policy**
The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

**Originality Checking Software**
The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software

Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

**Student Use of Course Materials**

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.

**Faculty of Science**
**Student Resources and Support**

**University Policies and Programs**

Important Dates in the Academic Year (including add/drop dates): http://www.dal.ca/academics/important_dates.html
Classroom Recording Protocol: https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html
Dalhousie Grading Practices Policies: https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html
Grade Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html
Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html
Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html

**Learning and Support Resources**

General Academic Support – Advising (Halifax): https://www.dal.ca/campus_life/academic-support/advising.html
General Academic Support – Advising (Truro): https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html
Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html
On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html
Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html
Indigenous Connection: https://www.dal.ca/about-dal/indigenous-connection.html
Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803: https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf
Black Student Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html
International Centre: https://www.dal.ca/campus_life/international-centre.html
South House Sexual and Gender Resource Centre: https://southhousehalifax.ca/about/
LGBTQ2SIA+ Collaborative: https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html
Dalhousie Libraries: http://libraries.dal.ca/
Copyright Office: https://libraries.dal.ca/services/copyright-office.html
Dalhousie Student Advocacy Services: https://www.dsu.ca/dsas?rq=student%20advocacy
Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html
Human Rights and Equity Services: https://www.dal.ca/dept/hres.html
Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html
Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html
Faculty of Science Advising Support: https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html

**Safety**

Biosafety: http://www.dal.ca/dept/safety/programs-services/biosafety.html
Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html
Radiation Safety: http://www.dal.ca/dept/safety/programs-services/radiation-safety.html
Laser Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html