

Faculty of Science Course Syllabus
Department of Chemistry**CHEM 1012/1022 – Concepts in Chemistry II: Energy & Equilibrium**

Welcome to Chemistry 1012/1022! We have created a comprehensive course syllabus to address any questions you may have throughout the term. This syllabus serves as a guide and a contract between students and instructors, setting clear expectations of the course and helping you prepare for the semester. Please note that the policies in this syllabus are final and non-negotiable.

The teaching team is proudly here and ready to support you throughout your journey in First Year Chemistry. We are committed to your success and look forward to assisting you in any way that we can. However, please be mindful that this is a very large class, and support may be limited at times. We appreciate your understanding and patience.

Use the table of contents (with links) below to navigate the syllabus and review important dates and policies. We hope you have an enjoyable and productive semester in First Year Chemistry!

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Land Acknowledgement

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights in Canada.

African Nova Scotian Acknowledgement

We recognize that African Nova Scotians are a distinct people whose histories, legacies and contributions have enriched that part of Mi'kma'ki known as Nova Scotia for over 400 years.

Section 1: General Course Information

Who to Contact?

If you have questions about Chem 1012/1022 please do not hesitate to contact one of the First Year Chemistry Coordinators. The best way to contact the First Year Chemistry Coordinators is by email using your **Dalhousie email account**. Please allow up to **5 business days** for a response and note that emails sent in the evening or on weekends may not be seen until the next business day.

For inquiries about the **Laboratory** portion of the course, please contact:



Dr. Jennifer MacDonald
(pronouns: she/her)
First Year Chemistry Lab Coordinator

Email: chemlab@dal.ca

For **all other inquiries** regarding the course, please contact:



Dr. Angela Crane-Garnier
(pronouns: she/her)
First Year Chemistry Course Coordinator

Email: chemlect@dal.ca

Please note, chemistry content related questions should be directed to the assortment of instructors, professors and teaching assistants (TAs) available to meet with students in the *Concept* Room, not to the coordinator email accounts. The main reason for this is chemistry content questions are not easily answered via email, and students will likely get a much faster response in the *Concept* Room or Resource Centre. However, don't worry, we have plenty of staff to help students throughout the course!

Mode of Delivery

This course will be held in-person on the Studley Campus of Dalhousie University in Halifax, Nova Scotia, Canada. All lecture and laboratory sections will be in-person (please refer to Sections 2 and 3 of this syllabus for complete details). All times listed in this syllabus are based on the Atlantic time zone.

Students should also note that you are only guaranteed a space/seat in the lecture and lab sections that you have registered for. Please attend the correct lecture and lab section based on your DalOnline schedule.

Important Academic Dates

Wednesday, January 7, 2026

Winter term classes begin

Thursday, January 22, 2026

Last day to add or drop a Winter term course

Tuesday, February 5, 2026

Last day to drop a Winter term course without a “W”

Friday, February 6, 2026

Munro Day – University closed

Monday, February 16 – Friday, February 20, 2026

Winter Study Break – no classes

Monday, February 16, 2026

Nova Scotia Heritage Day – University closed

Monday, March 9, 2026

Last day to drop a Winter term course with a “W”

Friday, April 3, 2026

Good Friday – University closed

Wednesday, April 8, 2026

Follows the Friday schedule

Thursday, April 9, 2026

Last day of Fall term classes – Follows the Friday schedule

Thursday, April 11 – Tuesday, April 27, 2026

Winter term exam period

Chemistry 1012/1022 Grading Scheme

To calculate a final numerical grade for Chemistry 1011/1021 the following grading scheme will be followed. A detailed breakdown of how grades are distributed for each course activity can be found in the individual section for each component.

*Lecture Component:*Homework Assignments

Beyond the Classroom Reflective Assignments	1%
Experience Points (In-class Assignments)	5%

Mastery Points

Four (4) Mastery Exams	64%
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*Laboratory Component:*Lab Safety

Lab Map & Safety Module	1%
WHMIS Course Module	3%
Lab Station Clean-up	1%

Lab Work

Pre-Lab Assignments	5%
Post-Lab Reports	15%
Participation: Data Collection/Raw Data Submission	3%
Time Management & Preparedness	2%

Total: 100%

In order to obtain a passing grade in Chem 1012/1022, students must meet **ALL** of the following criteria:

- Obtain a grade of at least 32/64 on the “Mastery Points” portion of the course.
- Obtain a grade of at least 15.00/30 on the “Laboratory Component” of the course with 12.50/25 from “Lab Work.”
- Obtain a total combined grade of at least 50/100.

No additional assessments (extra credit assignments or supplementary exam retakes) will be given. Final grades will be calculated based on the assessments laid out in this syllabus only.

Under emergency circumstances that have a serious impact on the delivery of this class, *there may be a need to alter the syllabus.*

Dalhousie Common Grading Scheme

The final grade posted to your transcript will be determined based on the numerical grade calculated by the Chemistry 1012/1022 Grading Scheme and converted to a letter grade based on the Dalhousie Common Grading Scheme seen below. Note the expectations of students in each grade category as is outlined in the definition of each letter grade category.

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

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

Grade	Definition
A+, A, A–	Excellent: Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.
B+, B, B–	Good: Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature
C+, C, C–	Satisfactory: Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from their university experience.
D	Marginal Pass: Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of 'C' is required).
F	Inadequate: Insufficient evidence of understanding of the subject matter; weakness in critical and analytical skills; limited or irrelevant use of the literature.

For more information about Dalhousie University's Grading Practices, please refer to:
https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Frequently Asked Question: How do I email an Instructor/Professor?

The following section will be relevant to all your courses at Dalhousie.

When emailing an instructor/professor, please remember to:

- **Always use your “@dal.ca” email account.** This is very important, especially if you are discussing grades. Many instructors/professors will not respond with personal information, such as grades, unless you are writing from your Dalhousie email account. *This is particularly true in First Year Chemistry.*
- Use an **informative subject line.** Many instructors/professors get hundreds of emails a day. This keeps an email from getting lost or forgotten.
- Use an **appropriate greeting.** Most faculty will let you know if they want to be addressed more formally (*example: Dr. Crane*) or more informally (*example: Angela*). If you are unsure, typically you would assume a formal greeting at first to maintain professionalism.
- Keep emails **professional**, this means no “text speak”, and writing in full sentences.
- Include the **course code.** Many instructors/professors teach multiple classes, and will not be able to assist you if they do not know which course you are in.
- Sign your email with your **full name and student ID (Banner number, ie. B00#####)**. This is very important as often classes can have students with the same or similar names, and we want to ensure that you receive the correct information. *This is especially true in a big class like First Year Chemistry, where there are typically over 1000 students per term!*

<p>Date: Monday, 11 Sept 2023 11:49:19 -0700 From: rufftime@randomemailaccount.com To: chemlect@dal.ca Subject: i need 2 cu</p> <hr/> <p>yo</p> <p>i need 2 cu asap cuz idk ne chem. 2moro ok 4u?</p> <p>tfn B-dawg</p> <p>Sent from my phone</p>		<p>Date: Monday, 11 Sept 2023 11:49:19 -0700 From: br123456@dal.ca ← Official Dal Email Account To: chemlect@dal.ca Subject: Chem 1011 – Schedule an appointment ← Informative subject line</p> <hr/> <p>Dear Dr. Crane, ← Appropriate greeting My name is Brody and I am in your Chem 1011 class. I would like to make an appointment with you to discuss study techniques. Do you have any time next Tuesday to meet with me? I am available from 10am – 4pm. ← Full sentences, no “text speak”, Course number</p> <p>Sincerely,</p> <p>Brody “the dog” Garnier ← B00123456 ← Student ID (Banner Number) Sent from my phone</p>
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**Note: The student “Brody Garnier” used in this email example is fictitious and no identification with actual persons (living or deceased) is intended or should be inferred. In fact, the “Brody Garnier” referred to here is Dr. Crane’s dog.*

Frequently Asked Question: How do I access CAPA?

Many of the online assessments in both the lecture and laboratory component will be hosted on the online learning platform, CAPA, which can be accessed by going to <https://capa.chemistry.dal.ca/>. Please use the following instructions when logging into CAPA for the first time:

1. Go to <https://capa.chemistry.dal.ca>
2. Click "Forgot password?"
3. Input your LON-CAPA username (your NetID using **lowercase** letters, example: aa123456) and your Dalhousie e-mail address in LON-CAPA (your NetID@dal.ca, example: aa123456@dal.ca) and press "Proceed".
4. Check your Dalhousie e-mail. An email will be sent from LON-CAPA helpdesk containing a password reset link. Click this link.
5. Once again, input your LON-CAPA username (NetID, lowercase), your Dalhousie e-mail address (NetID@dal.ca) and set/confirm a password and click "Save".
6. You will get a confirmation page and email for the reset of your password. Next click "Go to the login page".
7. From now on you will be able to login as normal with your LON-CAPA username (NetID, lowercase) and the password you created.
8. If you have issues logging into CAPA please email help@conceptschemistry.ca

Frequently Asked Question: What happens if the course gets interrupted?

In the event that any course activity is interrupted due to snow, power outage, or any other event/circumstance in Halifax or at Dalhousie University that is beyond the First Year Chemistry Teaching Team's control, please pay close attention to your Dalhousie Email Account and the Announcements made on the Brightspace Course Sites for the most up to date information.

Frequently Asked Question: What should I do if I become sick during term?

As always, we realize that we are all human, and getting sick during term is something that happens to the best of us (even us as instructors!). This is particularly on our mind as we have just experienced the COVID-19 Global Pandemic, which in many ways is still affecting us. As such, we wanted to address this point specifically.

First, if you are ill and unable to complete course work, do not panic, and instead contact **both** chemlect@dal.ca and chemlab@dal.ca as soon as you can. The sooner we know the situation the sooner we can develop a plan. If it is a short illness, the course policies laid out in this syllabus may already cover the plan of action. Please take note of the policies surrounding individual course assessments as you read through. If it is a long-term illness that is affecting several weeks of classes then we will be working with students on a case-by-case basis, along with the Student Accessibility Centre and the Assistant Dean of Science dedicated to Student Affairs, to determine the best plan for finishing course work.

Important Note: *No extensions or exemptions will be given for any assignment/assessment that counts towards Experience Points or are worth less than 5%. This is because there is already flexibility built into their grading (i.e. assignments are available for a long period of time, best before and expiry or late work due dates exist, only the top questions/assignments counting for full marks and the possibility to gain bonus marks) or these assignments are worth a negligible amount ($\leq 1\%$).*

Section 2: Lecture Component

Required Lecture Materials

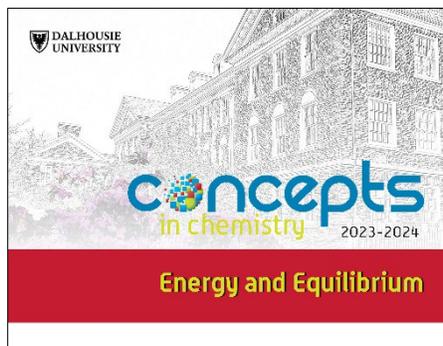
Course Textbook

Concepts in Chemistry: Energy and Equilibrium (2025–26 Ed.)

This course textbook is a custom eBook and is updated frequently to reflect changes in the curriculum. The textbook includes many practice problems, including exam bank problems which are located in an appendix at the end of the book, making this a valuable resource for mastering course content and preparing for the Mastery Exams.

Students are strongly encouraged to obtain a copy to support their learning and success in the course.

This eBook is available through the Dalhousie Bookstore only.



Non-programmable Scientific Calculator

Only 2 types of calculators are permitted during exams in Chem 1012/1022.

It is required that students registered in engineering and physics have the **CASIO fx-991ES PLUS** calculator, or equivalent (such as the CASIO fx-991ES PLUS C, CASIO fx-991ES PLUS 2 and the CASIO fx-991ES PLUS C 2nd edition)

It is required that all other science students have the **SHARP EL-510 series calculator** (the current model is the SHARP EL-510RTB, but older models such as the SHARP EL-510RNB will be accepted).

Both calculators are available at the Dalhousie Bookstore, however students may be able to find these calculators from alternative vendors



CASIO fx-991ES PLUS



SHARP EL-510RTB

Lecture Teaching Team



Ryan Snitynsky
(pronouns: he/him)

Learning Facilitator

McCain Arts and Social Sciences Building -
Auditorium 1 (Scotiabank)

8:35 – 9:25am MWF

CHEM 1022 section 01

CHEM 1012 section 03

9:35 – 10:25am MWF

CHEM 1022 section 02

CHEM 1012 section 04



Dr. Angela Crane-Garnier
(pronouns: she/her)

Learning Facilitator

McCain Arts and Social Sciences Building -
Auditorium 2 (Ondaatje)

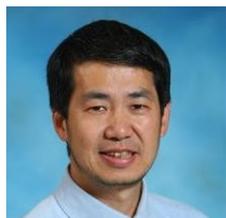
9:35 – 10:25am MWF

CHEM 1012 section 01

10:35 – 11:25am MWF

CHEM 1012 section 02

CHEM 1022 section 03

Concept Room

Dr. Peng Zhang
(pronouns: he/him)

**General Lecture
Support (Ondaatje)**



Dr. Mark Obrovac
(pronouns: he/him)

Concept Room

Lecture/Class Schedule

Date	Activity	Content to be familiar with based on the textbook sections...
Wed., Jan 7	Welcome and Introduction	The course syllabus + Chem 1011/1021 Review
Fri., Jan 9	Problem Solving Session 1	Sections 13.1 – 13.8 (pages 52-71)
Mon., Jan 12	Problem Solving Session 2	Sections 14.1 – 14.4 (pages 75-85)
Wed., Jan 14	Problem Solving Session 3	Sections 14.5 – 14.7 (pages 86-96)
Fri., Jan 16	Problem Solving Session 4	Sections 15.1 – 15.4 & 15.8 – 15.9 (pages 100-102 & 108-113)
Mon., Jan 19	Problem Solving Session 5	Section 15.7 (pages 107-108)
Wed., Jan 21	Problem Solving Session 6	Sections 15.5 – 15.6 & 15.10 – 15.13 (pages 103-106 & 114-123)
Fri., Jan 23	Problem Solving Session 7	Sections 16.1 – 16.5 (pages 127-134)
Mon., Jan 26	In-Class Review Session	No readings to prepare for this class
Wed., Jan 28	Mastery Exam 1	Covers Self Study B1, Topic 13 & 14
Fri., Jan 30	Problem Solving Session 8	Sections 16.6 – 16.9 (pages 135-149)
Mon., Feb 2	Problem Solving Session 9	Sections 17.1 – 17.4 (pages 152-159)
Wed., Feb 4	Problem Solving Session 10	Sections 17.5 – 17.7 (pages 160-170)
Fri., Feb 6	<i>Munro Day; No classes, University open</i>	
Mon., Feb 9	In-Class Review Session	No readings to prepare for this class
Wed., Feb 11	Mastery Exam 2	Covers Topic 15, 16 & 17
Fri., Feb 13	Problem Solving Session 11	Sections 18.1 – 18.5 (pages 173-183)
Mon., Feb 16	<i>NS Heritage Day; No classes, University closed</i>	
Wed., Feb 18	<i>Study Break; No classes, University open</i>	
Fri., Feb 20	<i>Study Break; No classes, University open</i>	
Mon., Feb 23	Problem Solving Session 12	Sections 18.6 – 18.8 (pages 184-189)
Wed., Feb 25	Problem Solving Session 13	Sections 19.1 – 19.7 (pages 190-203)
Fri., Feb 27	Problem Solving Session 14	Sections 20.1 – 20.6 (pages 206-217)

Continued...

Date	Class Information	Please be familiar with these textbook sections...
Mon., Mar 2	Problem Solving Session 15	Sections 20.7 – 20.8 (pages 218-224)
Wed., Mar 4	Problem Solving Session 16	Sections 21.1 – 21.7 (pages 227-246)
Fri., Mar 6	Problem Solving Session 17	Sections 21.8 – 21.11 (pages 247-252)
Mon., Mar 9	In-Class Review Session	No readings to prepare for this class
Wed., Mar 11	Mastery Exam 3	Covers Topic 18, 19, 20 & 21
Fri., Mar 13	Problem Solving Session 18	Sections 21.12-21.13 (pages 253-260)
Mon., Mar 16	Problem Solving Session 19	Sections 22.1 – 22.4 (pages 265-274)
Wed., Mar 18	Problem Solving Session 20	Sections 22.5 – 22.7 (pages 275-285)
Fri., Mar 20	Problem Solving Session 21	Sections 23.1 – 23.4 (pages 287-292)
Mon., Mar 23	Problem Solving Session 22	Sections 23.5 – 23.7 (pages 293-299)
Wed., Mar 25	Problem Solving Session 23	Sections 24.1 – 24.3 (pages 300-305)
Fri., Mar 27	Problem Solving Session 24	Sections 24.4 – 24.5 (pages 306-312)
Mon., Mar 30	Problem Solving Session 25	Sections 24.6 – 24.9 (pages 313-320)
Wed., Apr 1	Problem Solving Session 26	Sections 25.1 – 25.3 (pages 323-327)
Fri., Apr 3	Good Friday; No classes, University closed	
Mon., Apr 6	Problem Solving Session 27	Sections 25.4 – 25.7 (pages 328-339)
Wed., Apr 8	In-Class Review Session	No readings to prepare for this class
Thus., Apr 9	Friday's Schedule: Mastery Exam 4	Covers Topic 22, 23, 24 & 25

How to Prepare for Chem 1012/1022 Class

The format of each lecture will consist of professor/instructor-led problem solving followed by student-led practice (in completing the in-class engagement questions). Therefore, it is strongly suggested you prepare for class ahead of time. There are several ways you can do this:

- Read the etextbook sections for that class listed in the course syllabus
- Watch the pre-class videos on YouTube (links in Brightspace)
- Try some problems yourself on CAPA using the “Practice Problems (by class)” folder (note these are ungraded)

Beyond the Classroom Reflective Assignments

Beyond the Classroom Reflective Assignments can be found on the “CHEM1012 & CHEM1022 - Concepts in Chemistry II - Lecture – 2026 Winter” Brightspace Course Site and are submitted via MS Forms. These assignments are an opportunity for students to reflect on their learning, and how they learn, outside of the classroom.

Throughout the term, there are 6 Beyond the Classroom Reflective Assignments (approximately one every 2 weeks). Students are graded for completing the assignments on time. As these assignments are largely reflective in nature, there is often no “right” or “wrong” answer. **Students are expected to complete a minimum of 5 out of 6 assignments (worth 0.2 marks each) for a total of 1% of the course grade.** Students who complete all 6 assignments will be awarded a 0.2 mark bonus on their final numerical grade.

The Beyond the Classroom Reflective Assignment themes and due dates are listed below. When one assignment closes, the next one opens.

Assignment	Theme	Due Date (at 11:30pm)
1	Your Scientific Identity	Fri., Jan. 16
2	News vs. Literature	Fri., Jan. 30
3	Academic Underdogs	Fri., Feb. 13
4	Explain it like I'm 5	Fri., Mar. 6
5	“Dear Gabby” – responding to misinformation	Fri., Mar. 20
6	Named Reactions	Fri., Apr. 3

Experience Points

Experience points (XPs) are acquired by preparing for class and participating in the in-class engagement questions.

Attending class and collaborating with your peers is a valuable experience. During the in-class engagement questions you will be provided during class time to answer some short questions based on that days content. Students will be able to submit their response during class, up until 8am before the next class **online** via MS Forms. In the event a student is unable to attend class the links to the questions and the submission form will be provided on Brightspace to be completed by the same due date as the rest of the class.

Note: Students are asked to bring an electronic device that can connect to the internet (smart phone, tablet, laptop) to class for this activity. If you do not have such a device, please reach out to chemlect@dal.ca and we can provide an alternative.

Each question is worth 1 XP per correct response, with the top 80% of XPs being graded towards the 5%. **Example:** Imagine there are 26 XPs during the term. If a student receives 13 XPs during the term, they will get a grade of 3/5 on the Experience Points portion of the course. (80% of 26 XPs is 21 XPs, 13 XPs out of 21 XPs is 62%, 62% of 5 marks is 3/5 after rounding.)

Mastery Points

Mastery points are acquired through Mastery Exams, which will be evaluating the learning objectives of the course. To be successful in subsequent courses it is critical that students have mastered the learning objectives in CHEM1012/1022. Mastery points will be awarded based on the final overall grade for each Mastery Exam. Together, the combination of all four (4) Mastery Exam grades is worth 64% of the course overall at **21% per exam**.

Mastery Exams are graded based on skills mastery. Skills will be graded on a pass/fail basis, meaning part marks on questions are not awarded (i.e. the skill graded as fully mastered or not).

Mastery Exams

The details of each individual Mastery Exam are as follows:

- Mastery Exams, including the main content covered on each, will occur on the following dates:

Mastery Exam 1: Wednesday, January 28 covering Self Study B1, Topic 13 & Topic 14

Mastery Exam 2: Wednesday, February 11 covering Topics 15, 16 & 17*

Mastery Exam 3: Wednesday, March 11 covering Topics 18, 19, 20 & 21*

Mastery Exam 4: Thursday, April 9 covering Topics 22, 23, 24 & 25*

*On these exams there will be 1 question from **any previously tested Topic**. Therefore, Mastery Exams 2, 3 and 4 have a “cumulative” element to them.

- Each Mastery Exam will occur during class time.
- Each Mastery Exam will last **40 minutes**. This allows time for students to enter the room and get seated and exams to be passed out at the beginning, and time for exams to be collected at the end of the exams.
- The intention of each Mastery Exam is for students to demonstrate mastery of the skills they have been developing over the classes leading up to the exam. Students will be provided with a copy of the **“Data, Equations and Periodic Table”** and the **“Tables of Spectral Data”** found on the “CHEM1012 & CHEM1022 - Concepts in Chemistry II - Lecture – 2026 Winter” Brightspace Course Site. In addition, students will need to **bring their own approved non-programmable scientific calculator. Be sure to have an approved calculator as all other calculators are prohibited.** See the “Required Lecture Materials” section of this syllabus for information on approved calculators. **Besides a calculator and writing utensils, no other materials are permitted** in the exam. This includes, but is not limited to the course textbook, course notes, extra paper, “cheat” sheets and pocket periodic tables.
- Mastery Exams are **individual assessments**, therefore no collaboration with other students (i.e. cheating) is allowed.

Mastery Exam Storm Closure Policy

If Dalhousie University closes for weather/power outages affecting a Mastery Exam, the Mastery exam will take place during the very next class. In the case of Mastery Exam 4, since this exam occurs on the last day of classes, this exam would be pushed to the Final Mulligan Exam (see the next section for details). Any content missed during that class due to a university closure will become self-study material as to keep the lecture schedule intact. If there is inclement weather but Dalhousie University remains open, the Mastery Exam will go ahead as scheduled.

Make-up Mastery Exams

There are no make-up exams for Mastery Exams. If you miss a Mastery Exam you will be assigned a grade of 0 for that Mastery Exam, but you will have the opportunity to replace this 0 grade by completing the Mulligan exam during the exam period (see the next section for details).

Mulligan Exam

During the exam period (April 11-27, 2026) we will be offering a “**Mulligan Exam**”.

A “mulligan” is a sports term for a second chance to perform a task, especially after a mistake or miss was made during the first chance, that recognizes that the mistake or miss is probably not representative of the player’s ability. This term is used commonly in golf.

In this spirit, in Chem 1012/1022 the Mulligan Exam is an **optional exam opportunity whereby students will be able to retake any number of Mastery Exams**. This means, depending on your grade on the original Mastery Exams, you can choose to “redo” 1, 2, 3 or 4 Mastery Exams – or you can choose to opt-out entirely and take the grade you got on your original exams as the final grade. **Note: The Mulligan Exam questions will be different than those on the original Mastery Exams but will cover the same material at the same level of difficulty.**

The date and time of the Mulligan Exam will be determined in February based on the full Dalhousie Exam Schedule so there are no conflicts with other exams from other classes. The Mulligan Exam will last 3 hours. This means that if you redo all 4 Mastery Exams you will have ~45 minutes per exam, but if you redo less than 4 Mastery Exams you will have more time per exam.

Due to the Mulligan Exam, any student who did poorly on a Mastery exam, or missed a Mastery exam entirely, will have a second chance to improve their grade on that exam. **If the Mulligan Exam grade is not an improvement, the original exam grade will remain unchanged.** This means there is no penalty for taking a Mulligan exam. **Note:** Students cannot “mix and match” questions from the original Mastery exam and the Mulligan exam. The full grade on the original Mastery Exam will be compared to the full grade on the Mulligan exam to determine which grade is higher and used in final grade calculations.

More information about the details of the Mulligan Exam will be posted to the “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2026 Winter” Brightspace Course Site near the end of the semester.

How to Prepare for Chem 1012/1022 Exams

In generating the Mastery Exams the First Year Chemistry Teaching Team will be pulling question types from the Concepts in Chemistry: Energy and Equilibrium (2025-26 Ed.) section titled “Appendix 1 - Exam Bank Questions” at the end of the written text. Therefore, this is the **best resource for exam practice and preparation**.

There are other ways to prepare and practice:

- Try some problems on CAPA using the “Practice Problems (by topic)” folder (note these are ungraded and different than the “by class” problems)
- Try a Post-Topic Checkpoint on CAPA in the “Practice Post-Topic Checkpoints” folder (note these are ungraded and done as “escape room” style quizzes)

Section 3: Laboratory Component

**Location:**

Basement of the Chemistry Building
Room 100-108P

Winter 2026 Lab Schedule:

The lab schedule is posted on Brightspace and in the syllabus.

Labs Begin:

Wednesday, January 7th, 2026

Contacting Your Lab Instructor:

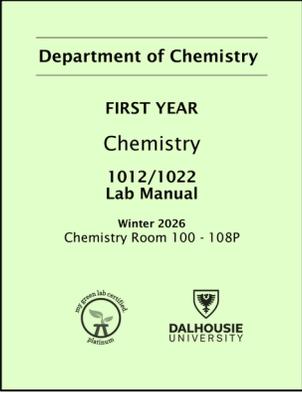
The laboratory instructor team communicates with students through one common email address, chemlab@dal.ca. Please include your lab section in the email subject line.

Laboratory Instructors

Please note that differing laboratory sections have differing laboratory instructors. Refer to the sections written on the right to determine who your laboratory instructor is. Please note that lab sections/instructors may change, and for the most up-to-date list of instructors and sections, please refer to the Lab Brightspace Page.

Instructor Photo	Instructor Name	Lab Sections
	Dr. Jennifer MacDonald (pronouns: she/her)	B01, B02, B03, B04, B09, B10
	Dr. Joshua Bates (pronouns: he/his)	B07, B08, B11, B12, B13, B14, B15, B16, B53, B54, B55, B56
	Dr. Marc Whalen (pronouns: he/him)	B05, B06, B51, B52
	Dr. <i>Gianna Aleman</i> (pronouns: she/her)	B17, B18, B57, B58

Required Materials for Lab

Lab Material Photo	Lab Material Description
	Lab Manual Available at the Dalhousie Bookstore (~\$25.99 + tax)
	Hardcover Lab Notebook Available at the Dalhousie Bookstore (~\$9.99 + tax)
	Safety Glasses Must be stamped with standards numbers of: CSA-Z94-3 Available at the Dalhousie Bookstore Safety Glasses (PYRAMEX, ~\$5.99 + tax) "OR" Safety Glasses For Over Glasses (3M, ~\$8.99 + tax)
	Knee-length Lab Coat (100% cotton) Available at the Dalhousie Bookstore (~\$29.99 + tax)

Safety Module and Lab Map

As a chemistry student, part of your training involves understanding the hazards that are present within a chemistry lab and learning the measures that must be taken in order to maximize your safety and the safety of your peers. As part of your lab assignment, you are required to complete a Chemistry Safety Module and Lab Map. The Safety Module and Lab Map Content is found in the “CHEM1012 & CHEM1022 – Concepts in Chemistry I – Lab – 2026 Winter” Brightspace Course Site in the content area “Laboratory Orientation and Safety”. Successful completion of the Safety Module Assignment includes reading the General Safety Statement on Brightspace and obtaining a perfect mark (i.e., 100%, 25 out of 25) on the five Safety Module Quizzes (located in CAPA on the First Year Chemistry Labs – 2026 Winter course space). Successful completion of the Lab Map Assignment includes completing the virtual laboratory tour on Brightspace, submitting your responses on CAPA, and obtaining a perfect mark (i.e. 100%, 35 out of 35). After completion of these requirements, you should feel comfortable working in a chemistry lab and have the tools you need to promote a safe lab environment.

Completion of the Safety Module and Lab Map, which is evaluated based on the submission of the CAPA Assignments, is **worth 1% of the overall final grade**. To receive a grade of 1 out of 1 on the Safety Module and Lab Map Assignment, the Safety Module and Lab Map Assessments must be submitted via CAPA by **11:30 pm local Halifax time on Sunday, January 18, 2026**.

Any Safety Module and Lab Map Assessments completed after the due date will not be graded, and partially complete Safety Module and Lab Map Assessments will receive a grade of zero (0).

No deadline extensions will be given on the Safety Module and Lab Map Assessments and “Student Declaration of Absence” forms cannot be applied to the Safety Module and Lab Map Assessments, as the assessments are open and available to students for more than 3 days.

Students who do not successfully complete this requirement will not be allowed to perform experiments in any Dalhousie undergraduate chemistry lab. Experiments missed due to incomplete Safety Module and Lab Map Assessments do not qualify for a make-up lab session.

If you have completed the Safety Module and Lab Map in Fall 2025, receiving scores of 25/25 and 35/35, respectively your grade will be transferred to your Winter 2026 course.

WHMIS Course Module

WHMIS, the Workplace Hazardous Materials Information System, is a global harmonized system used to classify and label hazards and regulate handling procedures within industry and academic fields, especially those in science and engineering. Regardless of your chosen field of study within science and engineering beyond first year, being familiar with WHMIS is a significant asset. As such, it is required that ALL students in first year chemistry enrol in and complete the Dalhousie University WHMIS Safety course provided by the Dalhousie Environmental Health and Safety Office offered through the Faculty of Open Learning and Career Development. As this course is substantial in nature, **completion of the course will be worth 3% of your final grade.** Instructions for how to register for the course are found on the Lab Brightspace Site under the content area "Laboratory Orientation and Safety." Please ensure that you register and complete the WHMIS course well in advance of the deadline (**11:30 pm local Halifax time on Sunday, January 18, 2026**).

Completion of the WHMIS Course Module is **worth 3% of the overall final grade. Only the Dalhousie WHMIS Safety Course Completion Certificate will be accepted for credit in Chem 1012/1022.**

Any WHMIS Course Modules completed after the due date will not be graded for credit and partially complete WHMIS Course Modules will receive a grade of zero (0).

No deadline extensions will be given on the WHMIS Course Module and "Student Declaration of Absence" forms cannot be applied to the WHMIS Course Module, as the Module is open and available to students for more than 3 days.

NOTE: Please ensure that you retain a copy of your WHMIS Completion Certificate. If you take any further chemistry courses at Dalhousie or work in a chemistry research lab, you will be required to provide your proof of WHMIS training.

Students who do not successfully complete this requirement will not be allowed to perform experiments in any Dalhousie undergraduate chemistry lab. Experiments missed due to incomplete WHMIS Training do not qualify for a make-up lab session.

If you have completed Dalhousie WHMIS Training and received a grade of 3/3 in Fall 2025, your WHMIS Grade will be transferred to your Winter 2026 course.

Laboratory Format, Expectations and Policies

You will complete eight lab sessions this term. Some experiments run for 1.5 hours while others run for 3 hours. Please be sure to check your experiment start time in the course syllabus as it may differ from the start time noted on your DalOnline class schedule. Before leaving your first lab period, make sure that you understand your Lab Schedule.

Experimental work must be completed during the scheduled time for your particular section.

Attendance is mandatory.

Online Experiments

Suggested Pathway Through A Lab Module

Each lab module contains:

1. The experimental background/theory
2. Pre-laboratory assignment support/practice questions and link to CAPA Site
3. Experiment content, data acquisition, and recording observations
4. Post-Lab Report

When beginning your experiment, you should work through the experimental background/theory sections of the module and the pre-laboratory assignment support/practice questions. Once you have completed these sections of the module and feel comfortable with the content, launch your CAPA Pre-lab Assignment and work through this assignment before the deadline.

After you have completed the Pre-Lab Assignment, you should move on to the experimental section of the laboratory module. Within this section of the module, you will be guided through the laboratory procedure and observe the experiment as it is being carried out through video. You will be able to record your observations in real-time in the module, this will become your experimental raw data set. Your experimental raw data set will be summarized at the end of the experimental section as a “Raw Data Summary” page. It is strongly recommended that you print (there is a print button available on the raw data slides) or write down a copy of your data to ensure a secondary back-up of your work. This raw data set will be required to complete your post-lab report.

Post-Lab Reports for online experiments will be submitted at your next scheduled in-person laboratory session as outlined in the Post-Lab Due Dates section of the syllabus.

In-Person Experiments

Before Your Experiment

You are expected to read the experiment, prepare your hard-covered notebook, and complete the pre-lab questions on CAPA.

A hard-covered notebook is required for this course. The notebook is a permanent record of your work; therefore, all entries must be written in ink and only on the right-hand page. Prior to each lab period, your notebook must be prepared with:

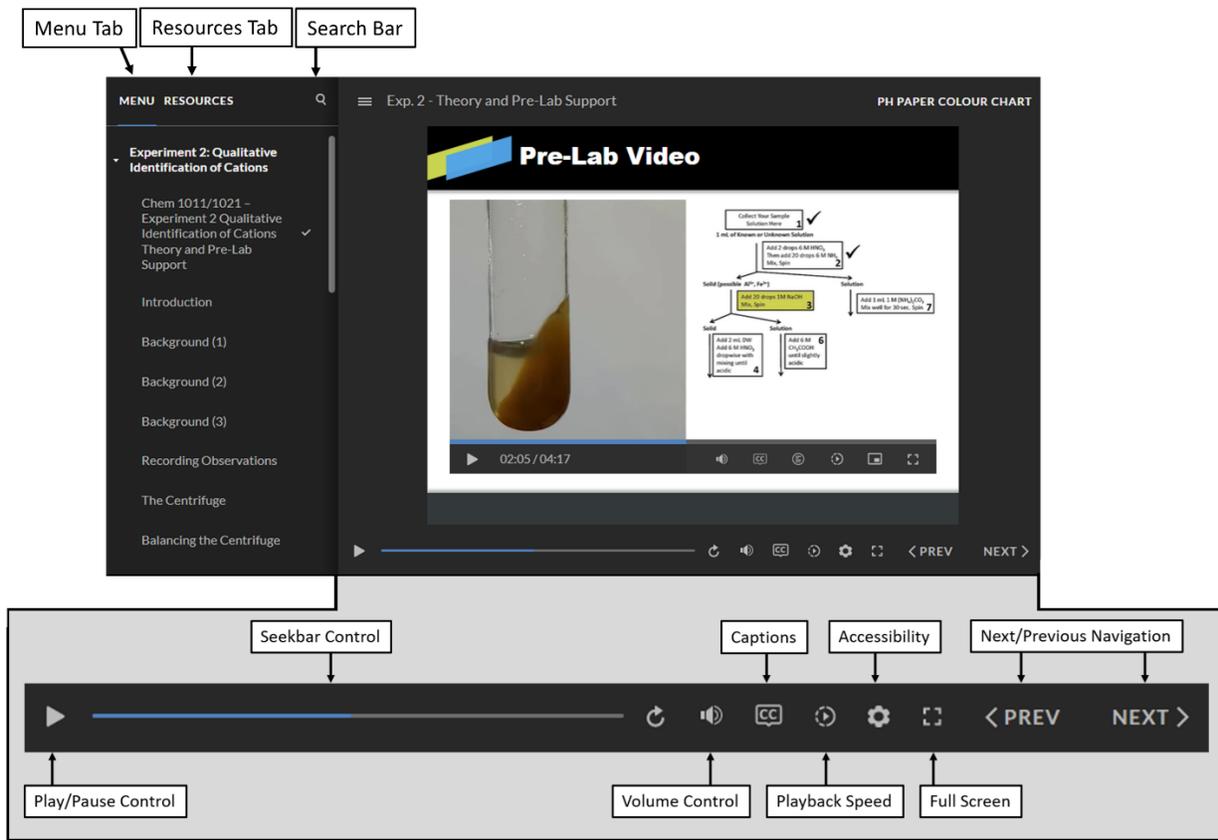
- Date
- Title of Experiment
- Data Tables and Observations from Raw Data Sheet. *If the experiment does not have a Raw Data Sheet, please use the Grade Sheet in your lab manual as a guide to prepare your lab notebook.*

Theory and Pre-Lab Support Module Structure

In addition to the content in your lab manual, there are optional Theory and Pre-Lab Support Modules on Brightspace that you may wish to use as you prepare for your CAPA Pre-Lab Assignments and your upcoming experiments. These modules contain a detailed walkthrough of theory, experimental videos, and interactive practice problems (with solutions!).

The lab module player features a menu, resources tab, and many more navigation controls to customize your experience. The Menu at the left allows you to navigate to any point in the module by slide title. The Resources tab at the left contains useful links and downloadable files (printable audio transcripts, data tables, links to the CAPA pre-lab assignment site, and any required Microsoft Form submission links).

An image of a Theory and Pre-Lab Support module can be found below, pointing out the menu and resources tabs, as well as the search bar, play/pause, seekbar, volume, captions, playback speed, accessibility, full screen, and previous/next navigation controls.



The screenshot displays a video player interface for a pre-lab video. At the top, there are three tabs: 'Menu Tab', 'Resources Tab', and 'Search Bar'. The main content area is divided into two sections. On the left is a navigation menu with the following items: 'Experiment 2: Qualitative Identification of Cations', 'Chem 1011/1021 - Experiment 2 Qualitative Identification of Cations Theory and Pre-Lab Support', 'Introduction', 'Background (1)', 'Background (2)', 'Background (3)', 'Recording Observations', 'The Centrifuge', and 'Balancing the Centrifuge'. The right section features a video player titled 'Pre-Lab Video' showing a test tube with a yellow liquid. To the right of the video is a flowchart with six numbered steps: 1. Collect Your Sample Solution Here; 2. Add 2 drops of 6 M HNO₃, then add 20 drops of 6 M NH₃ (NH₃ Soln); 3. Add 20 drops of 1 M NaOH (NaOH Soln); 4. Add 2 mL clear Add & 6 M HNO₃, stir vigorously with mixing until; 5. Add 2 mL of 1 M (NH₄)₂CO₃ (NH₄ Soln); 6. Add 6 M CH₃COOH until clarity is lost. Below the video is a control bar with buttons for 'Play/Pause Control', 'Seekbar Control', 'Volume Control', 'Playback Speed', 'Full Screen', 'Captions', 'Accessibility', and 'Next/Previous Navigation'.

During Your Experiment

Each laboratory period begins with a lab lecture and/or video. New techniques are demonstrated, and safety considerations discussed. During this time, a teaching assistant will check and initial your notebook for the above entries and collect laboratory reports that are due that day.

During the experiment, **all data must be recorded in ink** in your notebook. Erasers or liquid paper are not permitted. Simply cross out errors, which are part of the scientific process.

After completing the experiment, you must have the data in your notebook initialed again by the instructor or teaching assistant. If the experiment requires the submission of a Raw Data Sheet, your instructor or teaching assistant will initial this sheet at the same time as your data in your notebook. **Only the initialed data from the Raw Data Sheet may be used to complete your post-lab report.** Ensure your glassware and lab bench are left clean and neat.

After Your Experiment

There will be a post-lab report (the Grade Sheet found in the lab manual). More information about the post-lab report weighting scheme and due dates can be found in the Post-Lab Report Weighting Scheme and Post-Lab Due Dates sections of the syllabus. Written reports **must be completed in dark pen (blue or black ink).**

Laboratory Schedule

The exact laboratory schedule will be different for each student depending on their laboratory section. Please find **your lab section** and highlight the row to find **your laboratory experiment schedule**. Online lab sessions are asynchronous and in-person lab sessions are synchronous.

Sect.	Day	Exp. 8	Exp. 9	Exp. 10	Exp. 11	Exp. 12 & 13	Exp. 14	Exp. 15	Exp. 16
B01	Mon.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 19 1:30–3pm	Jan. 26 1:30–4:30pm	Feb. 9 1:30–4:30pm	Mar. 2 1:30–3pm	Mar. 9-13 Online	Mar. 23 1:30–4:30pm
B02	Mon.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 19 3–4:30pm	Feb. 2 1:30–4:30pm	Feb. 23 1:30–4:30pm	Mar. 2 3–4:30pm	Mar. 9-13 Online	Mar. 30 1:30–4:30pm
B03	Mon.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 19 2:30–4pm	Jan. 26 2:30–5:30pm	Feb. 9 2:30–5:30pm	Mar. 2 2:30–4pm	Mar. 9-13 Online	Mar. 23 2:30–5:30pm
B04	Mon.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 19 4–5:30pm	Feb. 2 2:30–5:30pm	Feb. 23 2:30–5:30pm	Mar. 2 4–5:30pm	Mar. 9-13 Online	Mar. 30 2:30–5:30pm
B05	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 8:30–10am	Jan. 27 8:30–11:30am	Feb. 10 8:30–11:30am	Mar. 3 8:30–10am	Mar. 9-13 Online	Mar. 24 8:30–11:30am
B06	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 10–11:30am	Feb. 3 8:30–11:30am	Feb. 24 8:30–11:30am	Mar. 3 10–11:30am	Mar. 9-13 Online	Mar. 31 8:30–11:30am
B07	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 2:30–4pm	Jan. 27 2:30–5:30pm	Feb. 10 2:30–5:30pm	Mar. 3 2:30–4pm	Mar. 9-13 Online	Mar. 24 2:30–5:30pm
B08	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 4–5:30pm	Feb. 3 2:30–5:30pm	Feb. 24 2:30–5:30pm	Mar. 3 4–5:30pm	Mar. 9-13 Online	Mar. 31 2:30–5:30pm
B09	Wed.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 21 10:30am–12pm	Jan. 28 10:30am–1:30pm	Feb. 11 10:30am–1:30pm	Mar. 4 10:30am–12pm	Mar. 9-13 Online	Mar. 25 10:30am–1:30pm
B10	Wed.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 21 12–1:30pm	Feb. 4 10:30am–1:30pm	Feb. 25 10:30am–1:30pm	Mar. 4 12–1:30pm	Mar. 9-13 Online	Apr. 1 10:30am–1:30pm
B11	Wed.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 21 1:30–3pm	Jan. 28 1:30–4:30pm	Feb. 11 1:30–4:30pm	Mar. 4 1:30–3pm	Mar. 9-13 Online	Mar. 25 1:30–4:30pm
B12	Wed.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 21 3–4:30pm	Feb. 4 1:30–4:30pm	Feb. 25 1:30–4:30pm	Mar. 4 3–4:30pm	Mar. 9-13 Online	Apr. 1 1:30–4:30pm
B13	Wed.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 21 2:30–4pm	Jan. 28 2:30–5:30pm	Feb. 11 2:30–5:30pm	Mar. 4 2:30–4pm	Mar. 9-13 Online	Mar. 25 2:30–5:30pm
B14	Wed.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 21 4–5:30pm	Feb. 4 2:30–5:30pm	Feb. 25 2:30–5:30pm	Mar. 4 4–5:30pm	Mar. 9-13 Online	Apr. 1 2:30–5:30pm
B15	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 8:30–10am	Jan. 29 8:30–11:30am	Feb. 12 8:30–11:30am	Mar. 5 8:30–10am	Mar. 9-13 Online	Mar. 26 8:30–11:30am
B16	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 10–11:30am	Feb. 5 8:30–11:30am	Feb. 26 8:30–11:30am	Mar. 5 10–11:30am	Mar. 9-13 Online	Apr. 2 8:30–11:30am
B17	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 2:30–4pm	Jan. 29 2:30–5:30pm	Feb. 12 2:30–5:30pm	Mar. 5 2:30–4pm	Mar. 9-13 Online	Mar. 26 2:30–5:30pm
B18	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 4–5:30pm	Feb. 5 2:30–5:30pm	Feb. 26 2:30–5:30pm	Mar. 5 4–5:30pm	Mar. 9-13 Online	Apr. 2 2:30–5:30pm
B51	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 10–11:30am	Jan. 27 10am–1pm	Feb. 10 10am–1pm	Mar. 3 10–11:30am	Mar. 9-13 Online	Mar. 24 10am–1pm
B52	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 11:30am–1pm	Feb. 3 10am–1pm	Feb. 24 10am–1pm	Mar. 3 11:30am–1pm	Mar. 9-13 Online	Mar. 31 10am–1pm
B53	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 1–2:30pm	Jan. 27 1–4pm	Feb. 10 1–4pm	Mar. 3 1–2:30pm	Mar. 9-13 Online	Mar. 24 1–4pm
B54	Tues.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 20 2:30–4pm	Feb. 3 1–4pm	Feb. 24 1–4pm	Mar. 3 2:30–4pm	Mar. 9-13 Online	Mar. 31 1–4pm
B55	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 10–11:30am	Jan. 29 10am–1pm	Feb. 12 10am–1pm	Mar. 5 10–11:30am	Mar. 9-13 Online	Mar. 26 10am–1pm
B56	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 11:30am–1pm	Feb. 5 10am–1pm	Feb. 26 10am–1pm	Mar. 5 11:30am–1pm	Mar. 9-13 Online	Apr. 2 10am–1pm
B57	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 1–2:30pm	Jan. 29 1–4pm	Feb. 12 1–4pm	Mar. 5 1–2:30pm	Mar. 9-13 Online	Mar. 26 1–4pm
B58	Thurs.	Jan. 7-9 Online	Jan. 12-16 Online	Jan. 22 2:30–4pm	Feb. 5 1–4pm	Feb. 26 1–4pm	Mar. 5 2:30–4pm	Mar. 9-13 Online	Apr. 2 1–4pm

Pre-Lab CAPA Assignments

All pre-lab Assignments will be hosted on the online learning platform, CAPA in the First Year Chemistry Labs – 2026 Winter course space, which can be accessed by going to <https://capa.chemistry.dal.ca>. Please refer to the instructions in the syllabus when logging into CAPA for the first time.

Pre-Lab Assignments will open *at least 1 week before the Pre-Lab Assignment due date.*

The online pre-lab assignments have been developed to help you prepare for the lab. Pre-Labs are **individual assessments**. Students may seek support through the online Theory and Pre-Lab Support Modules, Concept Room, Resource Centre, and discussion boards from TAs/Instructors, the laboratory coordinator, and classmates. However, all pre-lab work submitted for grading must be completed individually. This includes, but not limited to, data analysis (such as calculations and graphs) and discussions (such as answers to questions and conclusions). The Theory and Pre-Lab Support Module for each experiment contains content to support you in completing the pre-lab assignment. We encourage you to start early to ensure you are able to get help with the questions that cause you difficulty. You will be given **13 tries at each question**. The first 3 tries will be for full marks. For each subsequent try 10% of the questions point value will be deducted. **Each Pre-Lab is worth equal weight for a total of 5%.**

Online Labs - CAPA pre-labs assignment are due for online experiments as noted below:

- **Experiment 8 & 9:** January 23, 2026 at 11:30 PM local Halifax time.
- **Experiment 15:** March 13, 2026 at 11:30 PM local Halifax time.

In-Person Labs -CAPA pre-labs for in-person labs are due **5 minutes before your regularly scheduled lab**. For example, if a student is in lab section B01 and has a lab session beginning on Jan. 19, 2026 at 1:30 PM, their pre-lab would be due on Jan. 19, 2026 at 1:25 PM. **If for any reason you have made alternate arrangements for your lab session, your pre-lab deadline will remain the same, 5 minutes before your regularly scheduled lab.** No deadline extensions will be given on CAPA Pre-Lab Assignments as these assessments are open and available to students for more than 3 days.

Preparedness

When working in the lab it is important and expected that you arrive prepared for your session to ensure that you are a supportive and safe member of your lab group. For each Laboratory Experiment, students will be graded on their preparedness for the experiment. Preparedness includes completing the Pre-Lab Assignment on CAPA as well as arriving to the lab with their laboratory notebook prepared for in-person experiments. Student preparedness is **worth 1% of the overall lab grade**. A student who is unprepared 3 or more times during term will not be awarded this grade.

Participation - Data Collection and Raw Data Submission

Chemistry is first and foremost an experimental science. Your time in the laboratory is an important part of your chemical education. As such, participation is worth 3% of the overall lab grade. Participation is assessed via submission of your experimental data set through raw data sheets or in-lab report submissions for experiments that do not have a raw data sheet. **Each experiment's participation grade is worth equal weight for a total of 3%.**

Lab Station Clean-Up

Developing good lab housekeeping habits reduces the occurrence of lab accidents while also improving efficiency and quality of lab work completed in shared lab spaces. It is our shared responsibility (students and teaching team) to ensure the laboratory is a safe working environment. As such, lab station clean-up is worth 1% of the overall lab grade. The lab station clean-up grade will be assessed at the end of all 3-hour lab sessions. To be awarded this grade, your locker should contain only the required glassware, and your bench space is left clean. **Each lab station clean-up grade is worth equal weight for a total of 1%.**

Post-Lab Due Dates

A detailed table of all post-lab due dates is to follow. Please find **your lab section** and highlight the row to find **your post-lab due date schedule**.

Sect.	Exp. 8 & 9	Exp. 10	Exp. 11	Exp. 12 & 13	Exp. 14 & 15	Exp. 16
B01	Jan. 19, 1:30pm	Jan. 26, 1:30pm	Feb. 9, 1:30pm	Mar. 2, 1:30pm	Mar. 23, 1:30pm	Mar. 23, 4:30pm
B02	Jan. 19, 3:00pm	Feb. 2, 1:30pm	Feb. 23, 1:30pm	Mar. 2, 3:00pm	Mar. 30, 1:30pm	Mar. 30, 4:30pm
B03	Jan. 19, 2:30pm	Jan. 26, 2:30pm	Feb. 9, 2:30pm	Mar. 2, 2:30pm	Mar. 23, 2:30pm	Mar. 23, 5:30pm
B04	Jan. 19, 4:00pm	Feb. 2, 2:30pm	Feb. 23, 2:30pm	Mar. 2, 4:00pm	Mar. 30, 2:30pm	Mar. 30, 5:30pm
B05	Jan. 20, 8:30am	Jan. 27, 8:30am	Feb. 10, 8:30am	Mar. 3, 8:30am	Mar. 24, 8:30am	Mar. 24, 11:30am
B06	Jan. 20, 10:00am	Feb. 3, 8:30am	Feb. 24, 8:30am	Mar. 3, 10:00am	Mar. 31, 8:30am	Mar. 31, 11:30am
B07	Jan. 20, 2:30pm	Jan. 27, 2:30pm	Feb. 10, 2:30pm	Mar. 3, 2:30pm	Mar. 24, 2:30pm	Mar. 24, 5:30pm
B08	Jan. 20, 4:00pm	Feb. 3, 2:30pm	Feb. 24, 2:30pm	Mar. 3, 4:00pm	Mar. 31, 2:30pm	Mar. 31, 5:30pm
B09	Jan. 21, 10:30am	Jan. 28, 10:30am	Feb. 11, 10:30am	Mar. 4, 10:30am	Mar. 25, 10:30am	Mar. 25, 1:30pm
B10	Jan. 21, 12:00pm	Feb. 4, 10:30am	Feb. 25, 10:30am	Mar. 4, 12:00pm	Apr. 1, 10:30am	Apr. 1, 1:30pm
B11	Jan. 21, 1:30pm	Jan. 28, 1:30pm	Feb. 11, 1:30pm	Mar. 4, 1:30pm	Mar. 25, 1:30pm	Mar. 25, 4:30pm
B12	Jan. 21, 3:00pm	Feb. 4, 1:30pm	Feb. 25, 1:30pm	Mar. 4, 3:00pm	Apr. 1, 1:30pm	Apr. 1, 4:30pm
B13	Jan. 21, 2:30pm	Jan. 28, 2:30pm	Feb. 11, 2:30pm	Mar. 4, 2:30pm	Mar. 25, 2:30pm	Mar. 25, 5:30pm
B14	Jan. 21, 4:00pm	Feb. 4, 2:30pm	Feb. 25, 2:30pm	Mar. 4, 4:00pm	Apr. 1, 2:30pm	Apr. 1, 5:30pm
B15	Jan. 22, 8:30am	Jan. 29, 8:30am	Feb. 12, 8:30am	Mar. 5, 8:30am	Mar. 26, 8:30am	Mar. 26, 11:30am
B16	Jan. 22, 10:00am	Feb. 5, 8:30am	Feb. 26, 8:30am	Mar. 5, 10:00am	Apr. 2, 8:30am	Apr. 2, 11:30am
B17	Jan. 22, 2:30pm	Jan. 29, 2:30pm	Feb. 12, 2:30pm	Mar. 5, 2:30pm	Mar. 26, 2:30pm	Mar. 26, 5:30pm
B18	Jan. 22, 4:00pm	Feb. 5, 2:30pm	Feb. 26, 2:30pm	Mar. 5, 4:00pm	Apr. 2, 2:30pm	Apr. 2, 5:30pm
B51	Jan. 20, 10:00am	Jan. 27, 10:00am	Feb. 10, 10:00am	Mar. 3, 10:00am	Mar. 24, 10:00am	Mar. 24, 1:00pm
B52	Jan. 20, 11:30am	Feb. 3, 10:00am	Feb. 24, 10:00am	Mar. 3, 11:30am	Mar. 31, 10:00am	Mar. 31, 1:00pm
B53	Jan. 20, 1:00pm	Jan. 27, 1:00pm	Feb. 10, 1:00pm	Mar. 3, 1:00pm	Mar. 24, 1:00pm	Mar. 24, 4:00pm
B54	Jan. 20, 2:30pm	Feb. 3, 1:00pm	Feb. 24, 1:00pm	Mar. 3, 2:30pm	Mar. 31, 1:00pm	Mar. 31, 4:00pm
B55	Jan. 22, 10:00am	Jan. 29, 10:00am	Feb. 12, 10:00am	Mar. 5, 10:00am	Mar. 26, 10:00am	Mar. 26, 1:00pm
B56	Jan. 22, 11:30am	Feb. 5, 10:00am	Feb. 26, 10:00am	Mar. 5, 11:30am	Apr. 2, 10:00am	Apr. 2, 1:00pm
B57	Jan. 22, 1:00pm	Jan. 29, 1:00pm	Feb. 12, 1:00pm	Mar. 5, 1:00pm	Mar. 26, 1:00pm	Mar. 26, 4:00pm
B58	Jan. 22, 2:30pm	Feb. 5, 1:00pm	Feb. 26, 1:00pm	Mar. 5, 2:30pm	Apr. 2, 1:00pm	Apr. 2, 4:00pm

Post-Lab Report Weighting Scheme

Each Post-Lab Report contributes to your lab grade according to the following weighting scheme:

Experiment 8:	1.0 %
Experiment 9:	1.0 %
Experiment 10:	3.0 %
Experiment 11:	2.5 %
Experiment 12:	1.5 %
Experiment 13:	1.0 %
Experiment 14:	2.0 %
Experiment 15:	1.5 %
Experiment 16:	1.5 %
Total:	15%

Time Management

Besides arriving to the laboratory experiments on time, we expect students to manage their time outside of lab accordingly such that their post-lab reports are submitted on time. Therefore, effective time management is **worth 1% of the overall lab grade**. We do realize that occasionally a student may submit a post-lab report late; therefore, students with a maximum of 1 late report will still receive the time management grade. Post-lab reports submitted after the scheduled due dates will be accepted, but marked late, **if and only if** the post-lab report is submitted **BEFORE** the Late Work Submission Deadline. Late work is not accepted after the Late Work Submission Deadline as marked reports and feedback will be returned to students.

Missed Labs and Make-up Experiments

Online Labs - All online experiments will be available for students to complete after the Post-Lab Due Dates and until the Late Work Submission Deadlines. You do not need to make arrangements for a make-up lab for online experiments.

In-Person Labs - Please note that due to our high course enrollment, you are only guaranteed that your timetabled lab session will be available to you for your experiments as outlined in the syllabus. If you miss a lab, **you must email your lab instructor (chemlab@dal.ca) within 24 hours** of the missed lab to schedule a make-up experiment. Failure to do so may result in a grade of 0 for the missed lab. Make-up experiments are scheduled based on available seats in the laboratory, as a result, make-up lab session availability cannot be guaranteed.

Your email must include:

Subject line:	Body of your message:
1. course number	1. your name
2. lab section (e.g. B01)	2. student ID (B00#)
	3. course number and lab section
	4. experiment(s) missed
	5. your availability to attend lab sections leading up to the last opportunity for make-up labs (see the Lab Schedule and Last Opportunity for Make-up Labs Schedule before providing your availability)

This process filters your message to the correct instructor automatically (based on section in the subject line) which allows us to help you faster!

The lab instructor will then email you a letter of permission to do a make-up experiment at an agreed-upon time and assign a due date for your post-lab report. When you arrive to your make-up experiment you must check-in with the instructor to be assigned a temporary locker space.

A few notes about make-up experiments:

1. No student will be admitted to the lab for a make-up experiment without prior instructor permission.
2. No student will be allowed to do a make-up after posted deadlines.
3. No report will be accepted after the posted late submission deadlines.

Final Dates for Make-up Experiments and Late Work Submissions

Exp.	Last Opportunity for Make-up Lab (Group A)	Last Opportunity for Make-up Lab (Group B)	Late Work Submission Deadline (ALL Groups)
8	Online	Online	Mon., Jan. 26, before 1:30pm
9	Online	Online	Mon., Jan. 26, before 1:30pm
10	Jan 29	Jan 29	Mon., Feb. 9, before 1:30pm
11	Feb 5	Feb 12	Mon., Mar. 2, before 1:30pm
12 & 13	Feb 26	Mar. 5	Mon., Mar. 23, before 1:30pm
14	Mar. 26	Mar. 26	Mon., Apr. 6, before 1:30pm
15	Online	Online	Mon., Apr. 6, before 1:30pm
16	Apr. 2	Apr. 2	In-lab submission only

Please ensure that you know what group you are in (based on your lab section) to adhere to the above deadlines.

Group A: B01, B03, B05, B07, B09, B11, B13, B15, B17, B51, B53, B55, B57

Group B: B02, B04, B06, B08, B10, B12, B14, B16, B18, B52, B54, B56, B58

Laboratory Exemptions

Lab exemptions will be granted to those who have already completed the course (with a letter grade of A–F), have a grade of 40% or higher on the lecture component, and have a *lab grade of 67% (20/30) or better* on the lab component of the course.

Lab grades for lab exemption carry forward if the student repeats the course within a 24-month period of the original start date. For example, if a student enrolls in Chem 1012/1022 in Winter 2026 and completes the course with a grade of F, has 45% on the lecture component, and a lab score greater than 67% (20/30) the student would qualify for lab exemption in the following terms: Summer 2026, Winter 2027, and Summer 2027. After the 24-month window has passed the student will be required to retake the lab component when repeating the course.

Labs exemptions will not automatically be granted. You must contact the first-year lab coordinator (chemlab@dal.ca) prior to the term add/drop date to apply for a lab exemption.

Section 4: Concept Room & Chemistry Resource Centre

The **Concept Room** is staffed by faculty and senior TA members of the First Year Chemistry Lecture and Lab team who are available to answer lecture and lab content questions, CAPA assignment questions and Post-Lab Report questions.

The **First Year Chemistry Resource Centre** is an open student study space with tables for either individual or group study.

Typically, there is some staff (either in the *Concept Room* or the Chemistry Resource Centre) available to help you from approximately 10 am – 4:30 pm Monday to Friday. By offering a wide range of times with our First Year Chemistry teaching team, we hope that each student can find some slot that will work with their own course schedule.

The Full Concept Room and Chemistry Resource Centre schedule will be posted on the “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2026 Winter” and “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2026 Winter” Brightspace course sites in the “Concept Room & Resource Centre” content area.

The Resource Center and *Concept Room* **open on Monday, January 12, 2026.**

The Resource Center and *Concept Room* **are closed on Friday, February 6, 2026.**

The Resource Center and *Concept Room* **are closed during Study Break February 16-20, 2026.**

The Resource Center and *Concept Room* **are closed on Friday, April 3, 2026.**

The Resource Center and *Concept Room* **close on Thursday, April 8, 2026 at 4:30 pm.**

Section 5: Course Content & Learning Objectives

Course Description

Credit Hours: 3

The principles of thermodynamics and kinetics are used to explain chemical reactivity and the principles of organic chemistry are used to develop an understanding of organic synthesis.

Special topics include electrochemistry, spectroscopy, chirality, polymers, and the chemistry of living systems to illustrate the relevance of chemistry in everyday life.

PRE-REQUISITE: CHEM 1011.03, CHEM 1021.03 or equivalent

COORDINATORS: A. Crane, J. MacDonald

FORMAT: Lecture | Lab

LECTURE HOURS PER WEEK: 3 LAB HOURS PER WEEK: 3

EXCLUSIONS: Credit will be given for only one of the following combinations:

CHEM 1011.03/1012.03 or CHEM 1021.03/1022.03

Course Objectives and Goals

Our primary objective for First Year Chemistry is to offer you a comprehensive and relevant course on the fundamental concepts in chemistry. Our focus is on using problem solving techniques which are applicable and transferrable to all fields of science and engineering and are not limited to just the chemistry lens used in this course. We aim to help students build good independent study habits, time management skills, group collaborations and foster critical thinking in the sciences. By exemplifying the role of chemistry in our daily lives and in an interdisciplinary way, we hope that our students gain an appreciation for chemistry, regardless of their end academic goals.

Course Learning Outcomes

- State the name or chemical formula for common chemical species.
- Demonstrate problem solving skills in the context of chemistry.
- Draw organic molecules using multiple representations and use curly arrow mechanisms to show reaction transformations.
- Apply spectroscopic theories to determine chemical structure from spectra.
- Demonstrate understanding of proper laboratory techniques including pipetting, spectroscopy, and separations (centrifuging and column chromatography), while maintaining safety standards in the context of a chemical laboratory.
- Record laboratory observations and data in an organized and logical manner.
- Analyze and interpret observations and data to arrive at experiment conclusions.
- Report laboratory observations and data in an organized and logical manner.
- Manage time appropriately through preparing before laboratory sessions and submitting post-lab work on-time.
- Develop an experimental plan (with support of Pre-Lab assignment) to identify unknown samples.

Course Content*Topic 13: Ideal Gas Behaviour*

The Mercury Barometer and Pressure
The Ideal Gas Law
Density of Gases
Dalton's Law of Partial Pressures

Topic 14: Chemical Equilibria

The Equilibrium and Reaction Quotient Expressions
The Equilibrium Constant
Quantitative Data from the Equilibrium Expression
Relationship between the Equilibrium Constant and Gibbs Energy
Le Châtelier's Principle Gibbs Energy Change under Non-Standard Conditions
Apply the concepts of Chemical Equilibria to Gas Phase Reactions
Relate the Reaction Quotient to the Equilibrium Constant to determine how the Reaction will establish Equilibrium
Calculate equilibrium quantities using initial conditions and the equilibrium constant
Calculate Gibbs Energy under standard and nonstandard conditions
Apply Le Chatelier's Principle to predict the effect of perturbing an equilibrium

Topic 15: First Law of Thermodynamics

Kinetic Energy and Potential Energy
System and Surroundings
Specific Heat Capacity and Heat Capacity and Calorimetry
Heat and Temperature
Work and Volume
First Law of Thermodynamics: Heat and Work
State Functions
Enthalpy
Heating, Cooling and Enthalpies of Phase Changes
Explain the transfer of energy from a chemical perspective
Use heat capacity and specific heat capacity to explain how heat is transferred between the system and surroundings
Apply heat and work calculations to calculating the change in internal energy for a system
Distinguish between a reversible and an irreversible process for work
Describe a state function
Describe the relationship between enthalpy, heat and the reaction conditions (constant volume or constant pressure)
Distinguish between the different types of phase changes and relate the enthalpy changes to these processes
Apply heat calculations to calorimetry to explain the experimental determination of heat transfer

Topic 16: Hess's Law

Standard State and Standard Enthalpy Change
Thermochemical Equations and Enthalpy Diagrams
Hess's Law
Standard Enthalpy of Formation
Bond Enthalpies and Enthalpy of Reaction
Enthalpy Changes for Biological Processes
Calculate reaction enthalpies and enthalpy changes using Hess's Law
Calculate reaction enthalpies using standard enthalpies of formation
Estimate reaction enthalpies using bond enthalpies
Relate reaction enthalpies to the corresponding balanced chemical equations, reactant/product quantities and standard types of reactions (including formation, combustion and phase changes)

Topic 17: Defining the Second Law of Thermodynamics: Entropy

Entropy
Predicting Entropy Changes
Second Law of Thermodynamics
Third Law of Thermodynamics and ΔS°_{rx}
Define spontaneous processes and relate them to the concept of Entropy
Distinguish the entropy of the universe from the entropy of the system using the second law of thermodynamics
Calculate entropy changes in physical and chemical processes using the third law of thermodynamics
Predict the sign of entropy changes for physical and chemical processes

Topic 18: Gibbs Energy

Gibbs Energy
Gibbs Energy and Temperature
Calculating ΔG
Relate Gibbs Energy to the Entropy of the Universe
Assess the Gibbs Energy Dependence on Enthalpy, Entropy and temperature.
Relate the properties of state functions to Gibbs Energy

Topic 19: Reduction-Oxidation (RedOx) Reactions

The Fundamentals of Redox Reactions
Assigning Oxidation Numbers
Balancing Redox Reactions in Acidic Solution
Balancing Redox Reactions in Basic Solution
Assign oxidation numbers to elements, molecules and molecular ions
Balance redox reactions in acidic and basic solutions
Identify oxidation and reduction processes

Topic 20: Electrochemistry

Electrochemical Cells
Standard Half-Cell Potentials and Standard Cell Potentials
Calculations of Standard Cell Potentials
Cell Potentials, Gibbs Energies and Spontaneity
Cell Potentials under Non-Standard Conditions
Construct a simple electrochemical cell
Calculate cell potentials under standard and non-standard conditions for an electrochemical cell
Calculate Gibbs energy for an electrochemical cell under standard and non-standard conditions

Topic 21: Alkanes, Cycloalkanes and Functional Groups

Saturated Hydrocarbons
Cycloalkanes
Functional Groups in Organic Chemistry
Rules for Systematic Naming of Hydrocarbon Compounds
Alkenes, Alkynes and Aromatics
Alcohols and Ethers
Aldehydes and Ketones
Carboxylic Acids and Esters
Amines and Amides
Chirality
Apply systematic naming of organic compounds (name to structure and structure to name) with one functional group
Distinguish between a functional group and a substituent
Identify chiral centers (carbon only)
Distinguish between chiral and achiral compounds

Topic 22: Spectroscopy

Ultraviolet and Visible (UV/Vis) Spectroscopy
Infrared Spectroscopy (IR)
Nuclear Magnetic Resonance (NMR) Spectroscopy
Chemical Equivalence and Non-Equivalence
Calculate quantities using Beer's Law
Interpret infrared spectra for simple organic molecules
Interpret ^{13}C NMR spectra for simple organic molecules

Topic 23: Introduction to Chemical Reactions

Reactions of Organic Compounds
 $\text{S}_{\text{N}}2$ Substitution Reactions
Addition Reactions of Lithium Reagents
Diels-Alder Reactions
Predict products and draw curly arrow mechanisms for $\text{S}_{\text{N}}2$, Diels Alder and Alkyl Addition reactions

Topic 24: Rates of Chemical Reactions

Average Rate of Reaction
Instantaneous Rate of Reaction
Integrated Rate Laws for First & Second Order Reactions
Half-Life for First Order Reactions
Calculate quantities associated with the average rate of reaction
Determine the rate law for a reaction using experimental data
Calculate quantities associated with the first and second order integrated rate laws

Topic 25: Reaction Mechanisms

Mechanisms of Reactions
Temperature and the Rate of Reaction
Catalysis
Sketch a simple reaction coordinate diagram
Calculate quantities associated with the temperature dependence of rate constants (Arrhenius equation)
Describe the effect of a catalyst on a reaction coordinate diagram and activation energy
Differentiate between homogeneous and heterogeneous catalysis

Laboratory Experiments

Exp. 8 – Determination of the Atomic Mass of Magnesium
Exp. 9 – Using Solubilities to Identify 8 Unknown Solutions
Exp. 10 – Thermochemistry and the Heat of Reaction
Exp. 11 – Spectroscopic Determination of Copper in a Complex
Exp. 12 – A Series of Reactions Involving Copper
Exp. 13 – Partitioning and Spectroscopic Identification of Food Dyes
Exp. 14 – Organic Qualitative Analysis
Exp. 15 – A Clock Reaction
Exp. 16 – Identification of Six Household Projects

Section 6: University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of 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.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.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.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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

Statement: <http://www.dal.ca/cultureofrespect.html>

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 (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

Information: https://www.dal.ca/academics/important_dates.html

University Grading Practices

Information: https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Section 7: University-wide Student Resources and Support

Advising

General Advising: https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines: <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: <https://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Safety

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Scent-Free Program

Information: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

Dalhousie COVID-19 information and updates

Information: <https://www.dal.ca/covid-19-information-and-updates.html>