

**Faculty of Science Course Syllabus**  
**Department of Chemistry****CHEM 1011/1021 - Concepts in Chemistry: Structure and Reactivity**

Welcome to Chemistry 1011/1021! We have put together a comprehensive course syllabus that will address any question you may have throughout the term. A course syllabus is meant to act as a guide, but also serves as a contract between you and your instructors, for you to set your expectations of the course and prepare yourself accordingly for the semester. Please make use of the following table of contents (with links) when navigating the course syllabus and reviewing the course due dates and policies. We hope you have an enjoyable experience in First Year Chemistry and look forward to having a productive semester.

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## **Section 1: General Course Information**

### **Who to Contact?**

If you have questions about Chem 1011/1021 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**. When emailing a course coordinator, please use your **Dalhousie email account** for all course correspondence. Please allow up to **3 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](mailto: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](mailto: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 and Resource Centre, not to the coordinator email accounts. The main reason for this is chemistry content questions are not easily answered via email, and you 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 you throughout the course!

### **Mode of Delivery**

This course will be held mainly in-person on the Studley Campus of Dalhousie University in Halifax, Nova Scotia, Canada; All laboratory sections will be in-person, while students have the option to complete the lecture portion online, in-person or some combination of both (please refer to Section 2 of this syllabus for complete details). All times listed in this syllabus are based on the Atlantic time zone.

**Important Academic Dates**

*Monday, September 5, 2022*

Labour Day – University closed

*Tuesday, September 6, 2022*

Fall term classes begin

*Friday, September 16, 2022*

Last day to add or drop a Fall term course

*Friday, September 30, 2022*

National Day for Truth and Reconciliation – University closed

*Monday, October 3, 2022*

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

*Monday, October 10, 2022*

Thanksgiving Day – University closed

*Tuesday, November 1, 2022*

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

*Monday, November 7 – Friday, November 11, 2022*

Fall Study Break – no classes

*Friday, November 11, 2022*

Remembrance Day – University closed

*Tuesday, December 6, 2022*

Follows the Monday schedule

*Wednesday, December 7, 2022*

Last day of Fall term classes – Follows the Friday schedule

*Friday, December 9 – Tuesday, December 20, 2022*

Fall term exam period

*Saturday, December 24 – Saturday, December 31, 2022*

Winter Break – University closed

**Chemistry 1011/1021 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:*

Experience Points (Homework and Assignments)	20%
Mastery Points (Exams)	50%

*Laboratory Component:*Lab Orientation and Safety

Lab Orientation Module	1%
Lab Map & Safety Module	1%
WHMIS Course Module	3%

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 1011/1021, you must meet ALL of the following criteria:**

- Obtain at least a grade of 25/50 on the “Mastery Points” portion of the course.
- Obtain at least a grade of 15/30 on the “Laboratory Component” of the course with 12.5/25 from “Lab Work.”
- Obtain at least a total combined grade of 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 1011/1021 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](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 be able to make sure you get the correct information for you. *This is especially true in a big class like First Year Chemistry, where there are typically over 1000 students per term!*

<p>Date: Monday, 9 Sept 2020 11:49:19 -0700          From: yolo@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>ttfn          Lizzo</p> <p><i>Sent from my iPhone</i></p>	<p style="font-size: 2em; color: blue; transform: rotate(-15deg); opacity: 0.5;">WRONG</p>	<p>Date: Monday, 9 Sept 2020 11:49:19 -0700          From: <a href="mailto:student@dal.ca">student@dal.ca</a> ← <b>Official Dal Email Account</b>          To: chemlect@dal.ca          Subject: Chem 1011 – Schedule an appointment ← <b>Informative subject line</b></p> <hr/> <p>Dear Dr. Crane, ← <b>Appropriate greeting</b></p> <p>My name is Melissa and I am in your Chem 1011 class. I would like to make a virtual appointment with you to discuss study techniques. Do you have any time next Tuesday to meet with me? I am available from 10am – 4pm. ← <b>Full sentences, no “text speak”, Course number</b></p> <p>Sincerely,</p> <p>Melissa Jefferson ← <b>Full name</b>          B00123456 ← <b>Student ID (Banner Number)</b></p>
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**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](mailto:NetID@dal.ca), example: [aa123456@dal.ca](mailto: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](mailto: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](mailto: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 make our way through the on-going COVID-19 Global Pandemic. 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](mailto:chemlect@dal.ca) and [chemlab@dal.ca](mailto: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.

### COVID-19 Pandemic Objectives

Due to the strange and unpredictable time we are living in caused by the COVID-19 Global Pandemic, in this course, we will be striving to not only tackle the learning objectives of the course, but also these general objectives as well:

- To be kind and patient with ourselves and with each other
- To embrace the opportunity to learn in new ways and grow as students, educators, and citizens
- To do our best, knowing that this will likely be different than we are used to from other terms
- To communicate openly, clearly, and honestly about our expectations, concerns and goals. Tell us what you need and what's going on, and we will try to help you as best we can
- To be flexible. As we enter the phase of the COVID-19 pandemic where we are "living with COVID-19", we still recognize there is a level of uncertainty as to what that looks like. In this course, we have already built in flexibility into the way students can engage with the material and be graded. We hope that you, too, grant us flexibility throughout the term, since if the last year has taught us anything, it's that even the best laid plans may have to change as new information surrounding the COVID-19 pandemic arises.

Let's work together to make this the best class/semester possible, while recognizing that things may change as the situation continues to evolve.

*Thank-you to Dr. Michelle Brock (@MikkiBrock), Associate Prof at Washington & Lee University, for sharing these objectives for use by other educators via Twitter*

### Student Declaration of Absence Forms

Students can use a maximum of two (2) Student Declarations of Absence (SDA) per course per term (within September 6, 2022 and December 7, 2022), based on the Dalhousie University policies surrounding the Student Declaration of Absence forms ([https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/academic-policies/Information%20for%20students/faqs-for-students.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/Information%20for%20students/faqs-for-students.html)).

In Chem 1011/1021 these can be submitted for Mastery Exams only. ***This means a student can make-up a maximum of 2 Mastery Exams.***

SDA forms will not cover you if you are out for a prolonged period of time due to illness or other reasons. In these situations, email [chemlect@dal.ca](mailto:chemlect@dal.ca) and let us know as soon as possible so we can assist you best. In the case of prolonged absences withdrawing from the class, or requesting an ILL grade may be the best course of action.

## Section 2: Lecture Component

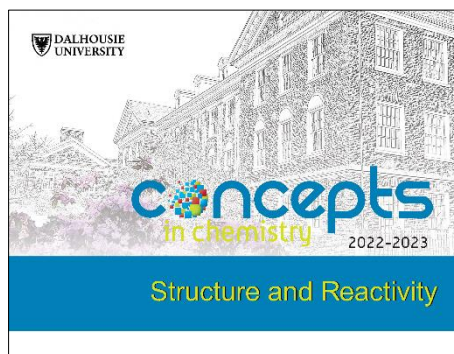
### Required Lecture Materials

#### *Course Textbook*

Concepts in Chemistry: Structure and Reactivity (2022–23 Ed.)

This course book serves as both a custom textbook and workbook for the course and is updated each year to reflect changes in the curriculum. Therefore, it is important to have a new book that has not been already annotated with notes.

This course textbook is available at the Dalhousie Bookstore only.



#### *Non-programmable Scientific Calculator*

Only 2 types calculators are permitted during exams in Chem 1011/1021.

It is required that students registered in engineering and physics have the **CASIO fx-991ES PLUS C** calculator, or equivalent (such as the CASIO fx-991ES PLUS, CASIO fx-991ES PLUS 2 and the CASIO fx-991ES PLUS C 2<sup>nd</sup> 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 you may be able to find these calculators from alternative vendors.



**CASIO fx-991ES PLUS C**



**SHARP EL-510RTB**

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**Lecture Teaching Team**

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

**Learning Facilitator**

Killam Library - MacMechan Auditorium

**8:35 – 9:25am MWF**

CHEM 1011/1021 section 01

**9:35 – 10:25am MWF**

CHEM 1011 section 04

CHEM 1021 section 02

**Asynchronous online offering**

CHEM 1011 section 05

**Concept Room**

Wednesdays 2 – 4 pm

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*Dr. Heather Andreas*  
(pronouns: she/her)

**Learning Facilitator**

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

**9:35 – 10:25am MWF**

CHEM 1011 section 02

**10:35 – 11:25am MWF**

CHEM 1011/1021 section 03

**Concept Room**

Fridays 1 – 3 pm

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*Eniko Zsoldos*  
(pronouns: she/her)

**General Lecture Support****Concept Room**

Mondays 12:30 – 2:30 pm

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*Dr. Mark Wall*  
(pronouns: he/him)

**Concept Room**

Tuesdays  
10 am – 12 pm



*Alastair Price*  
(pronouns: he/him)

**Concept Room**

Thursdays  
12 – 2 pm

**Lecture/Class Schedule**

<b>Date</b>	<b>Class Information</b>	<b>Please be familiar with these textbook sections...</b>
Wed., Sept 7	Welcome and Introduction	The course syllabus
Fri., Sept 9	Self-Studies A2/A3 – Chem Basics & Solutions	Sections A2.1 to A2.7 (pages 21-46) Sections A3.3 (pages 75-79)
Mon., Sept 12	Self-Studies A2/A3 - Chem Basics & Solutions	Sections A2.8 to A2.13 (pages 46-65) Sections A3.1, A3.2 & A3.5 (pages 71-75 & 82-83)
Wed., Sept 14	Self-Study A3 + Topic 1 – Solutions & The Atom	Sections A3.4 (pages 79-81) Sections 1.1-1.4 (pages 88-94)
Fri., Sept 16	Topic 1 – Atomic Spectra	Sections 1.5-1.7 (pages 95-106)
Mon., Sept 19	Topic 2 – Quantum Numbers	Sections 2.1-2.4 (pages 112-123)
Wed., Sept 21	Topic 2 – Electron configurations	Sections 2.5-2.11 (pages 124-144)
Fri., Sept 23	Topic 3 – Periodic Trends	Sections 3.1-3.7 (pages 152-163)
Mon., Sept 26	<b>Mastery Exam 1</b>	<b>Covers Self-Studies A2/A3 &amp; Topic 1</b>
Wed., Sept 28	Guest Lectures	No readings to prepare for this class
Fri., Sept 30	<b><i>National Day for Truth and Reconciliation; No classes, University closed</i></b>	
Mon., Oct 3	Topic 3 & 4 – Periodic Trends & Bonding	Sections 3.8-3.10 (pages 163-167) Sections 4.1-4.6 (pages 171-179)
Wed., Oct 5	Topic 5 – Lewis Structure Basics	Sections 5.1-5.5 (pages 182-198)
Fri., Oct 7	Topic 5 – Resonance and Acids	Section 5.7 (pages 201-207)
Mon., Oct 10	<b><i>Canadian Thanksgiving; No classes, University closed</i></b>	
Wed., Oct 12	Topic 5 – Large Lewis Structures	Section 5.6 (pages 198-201)
Fri., Oct 14	Topic 6 – VSEPR	Sections 6.1-6.5 (pages 210-220)
Mon., Oct 17	Topic 7 – Polarity & Chromatography	Sections 7.2-7.4 & 7.6 (pages 223-228 & 236-239)
Wed., Oct 19	Topic 7 – Intermolecular Forces	Section 7.5 (pages 228-236)
Fri., Oct 21	Topic 8 – Hybridization	Sections 8.1-8.7 (pages 242-258)
Mon., Oct 24	<b>Mastery Exam 2</b>	<b>Mainly covers Topics 2, 3, 4, 5 &amp; 6</b>

Continued...

<b>Date</b>	<b>Class Information</b>	<b>Please be familiar with these textbook sections...</b>
Wed., Oct 26	Guest Lectures	No readings to prepare for this class
Fri., Oct 28	Topic 8 – Orbital Overlap Diagrams	Sections 8.1-8.7 (pages 242-258)
Mon., Oct 31	Topic 9 – MO diagrams of the s-block	Sections 9.1-9.4 & part of 9.5 (pages 260-264 & 272)
Wed., Nov 2	Topic 9 – MO diagrams of the p-block	Section 9.5 (pages 265-271)
Fri., Nov 4	Topic 10 – An Intro to Acids/Bases	Sections 10.1-10.8 (pages 273-289)
Mon., Nov 7	<b>Study Break; No classes, University opened</b>	
Wed., Nov 9	<b>Study Break; No classes, University opened</b>	
Fri., Nov 11	<b>Remembrance Day; No classes, University closed</b>	
Mon., Nov 14	Topic 10 & 11 – Polyprotic Acids and Acidity/Basicity of Salt Solutions	Sections 10.9 (pages 294-298) Sections 11.7 (pages 327-329; omit Exercise 11.10 for now)
Wed., Nov 16	Topic 10 – Structural Influences on Acidity	Section 10.10 (pages 299-304)
Fri., Nov 18	Topic 11 – pH and Reactions of Strong Acids/Bases	Sections 11.2-11.5 (pages 308-318)
Mon., Nov 21	<b>Mastery Exam 3</b>	<b>Mainly covers Topics 7, 8 &amp; 9</b>
Wed., Nov 23	Guest Lectures	No readings to prepare for this class
Fri., Nov 25	Topic 11 – pH of weak acid/base solutions	Sections 11.6 (pages 319-326 + Exercise 11.10)
Mon., Nov 28	Topic 12 – An Introduction to Buffers	Sections 12.2-12.4 (pages 332-338)
Wed., Nov 30	Topic 12 – Preparing Buffer Solutions (part 1)	Sections 12.5-12.7 (pages 339-352)
Fri., Dec 2	Topic 12 – Preparing Buffer Solutions (part 2)	Sections 12.5-12.7 (pages 339-352)
Mon., Dec 5	<b>Mastery Exam 4</b>	<b>Mainly covers Topics 10, 11 &amp; 12</b>
Tues., Dec 6	<b>Monday's schedule</b> No chemistry class	Wishing you success on your exams!
Wed., Dec 7	<b>Friday's schedule</b> No chemistry class	

**Choose Your Own Adventure! A description of the Lecture Portion of the Course**

The lecture portion of Chem 1011/1021 is designed using active, inclusive and evidence based teaching practices. This means Chem 1011/1021 is likely designed very different from your other classes. This is ok! Every class you take in University will be different! That said, we wanted to explain why the lecture portion of Chem 1011/1021 is designed as it is – which ultimately revolves around a learning/learner centred approach that is flexible and fosters deeper learning overall.

What do we mean by a “choose your own adventure” course?

In this course, we know that students are entering the class with a varied level of pre-existing chemistry knowledge, and with completely different lived experiences and different commitments outside of class. We know that some students prefer to be in a classroom, while others prefer to work at their own pace online. We know that some students prefer to interact with their peers when problem solving, while others prefer to work independently. As such, we have designed Chem 1011/1021 such that you can choose what works best for your learning preferences and your life. This gives **you** control over your Chem 1011/1021 experience!

There are 3 options for taking this course, regardless of which section you are registered in:

1. Attend class in-person

***Note:** if you are registered in the online section and would like to attend class in-person, you may do so as long as there is an **empty seat** in the classroom after the in-person students have all taken their seats*

2. Attend class online

***Note:** this can be done synchronously during the synchronous session, or asynchronously through the recording posted*

3. Attend a mix of in-person and online classes

***Note:** this is considered to be hybrid. Students may choose to do this if they miss a class due to conflicts or illness, or because they feel like they need some extra help on a particular topic*

At the end of the day, regardless of how you choose to take the lecture portion of the course, as long as you are **engaging with the material and learning** we are happy! Everyone’s learning preferences are different and we respect students needing to choose what best works for them.

What is flipped learning?

The reason we are able to offer a “choose your own adventure” course is due to flipped learning. In the “lecture” portion of this course, we will be taking a “flipped” approach to teaching and learning. In a flipped learning classroom, the activities traditionally associated with going to class are done in the opposite order.

Traditionally, students are familiar with first going to class and receiving course content from their instructors/professors as a lecture. Then, at home after class students practice that material on their own (typically students spend 2 hours outside of class per every hour of in-class instruction). This particular model can pose challenges to students when they get stuck on a problem independently at home. The flipped classroom is an evidence-based way to avoid this issue.

In a flipped classroom, students start at home by watching short lecture videos to receive the course content. Then in-class, students actively engage in problem solving with their peers (either in-person or online), guided by the instructor/professor, who acts as a “Learning Facilitator”. The Learning Facilitator may do a quick recap of the course material, answer questions on the course content, and foster deeper learning and critical thinking in their students.

This type of learning will likely be quite different than what you are used to – but don’t worry! Extensive research has been done on this type of teaching and learning, and the benefits to students far outweigh any uncomfortableness you may feel as we get started in the course as we do something different. Some references on flipped learning have been added to the “CHEM1011 & CHEM1021 – Concepts in Chemistry I – Lecture – 2022 Fall” Brightspace Course Site for those interested in learning more.

Just remember, the three most important things to keep in mind in the “flipped classroom” are:

1. Flipped learning should not take any longer outside of the classroom than traditional learning – but the activities you do during this time will change. Typically, students spend 2 hours outside of class per every hour of in-class instruction.
2. Flipped learning does not work without adequate preparation. In this class we expect students to take approximately 1 hour to prepare for each lecture **before** arriving to class. The rest of your time at home will be studying and preparing for exams.
3. Flipped learning is an active style of learning. Therefore, when in-class solving problems, work with your peers sitting around you to discuss the problem, ask questions and delve deeper into the material.

### How does this affect grading?

In order to facilitate this course, and also allow flexibility in the way we grade the course, we have turned to “Specifications Grading” – or Specs Grading. In Specs Grading, students are given a multitude of **experiences** to practice their skills before they gain **mastery**. As such, we have divided the lecture component into “Experience” and “Mastery” assessments. In order to track students progress and experience, we have turned to a game-like system where we will be tracking students “Experience points”, or XPs. To gain these XPs, we have a wide array of assignments students can choose to do in order to practice their skills, many of which also offer multiple attempts or tries at the assignments. The intention is that students choose which assignments they want to do, so long as a minimum threshold of experience in the course is gained. You are not expected to complete all of the assignments, but the more experiences you have the better prepared you will be to show your mastery of the material.

Once a student has practiced the material, then it is time to show mastery of those skills. This occurs independently on exams. Students must prove mastery on the required skills in order to pass the Master Points portion of the course. **Passing the Mastery Points portion of the course is a requirement for passing the course overall.**

We hope in grading this way, we are able to maintain a flexible course structure (even in the assessments), so that you are able to get the most out of this course experience!



### Experience Points

Experience points (XPs) are acquired by preparing for class, participating in-class, practicing the material, preparing/studying for exams and engaging with the chemistry content. There are **many** different ways in which you can acquire experience points. Each activity, along with the XPs you can earn from the activity are listed below.

In total for the whole course there are over 3000 possible XPs a student can gain. The more you prepare, participate, practice and study the more XPs you will acquire. Based on the number of XPs you obtain you will be assigned a grade out of 20 for this portion of the course, based on the following criteria:

**Level 1:** 600 to 699 XPs – Grade of 2 out of 20

**Level 2:** 700 to 799 XPs – Grade of 4 out of 20

**Level 3:** 800 to 899 XPs – Grade of 6 out of 20

**Level 4:** 900 to 999 XPs – Grade of 8 out of 20

**Level 5:** 1000 to 1099 XPs – Grade of 10 out of 20

**Level 6:** 1100 to 1199 XPs – Grade of 12 out of 20

**Level 7:** 1200 to 1299 XPs – Grade of 14 out of 20

**Level 8:** 1300 to 1399 XPs – Grade of 16 out of 20

**Level 9:** 1400 to 1499 XPs – Grade of 18 out of 20

**Level 10:** 1500 to 2399 XPs – Grade of 20 out of 20

**BONUS LEVEL:** 2400+ XPs – Grade of 21 out of 20

### Pre-class Videos

#### *Description of this activity*

Pre-class videos will be posted on the “CHEM1011 & CHEM1021 - Concepts in Chemistry I - Lecture - 2022 Fall” Brightspace Course Site using the external learning tool Panopto. Each video is short (generally 2-5 minutes) in length and covers the basics of the content. These videos are best used to prepare for class, so watching these videos **before** class is strongly recommended/encouraged.

#### *How to gain XPs from this activity?*

2 XP per video will be granted if you watch the video **BEFORE** classes begin (at 8 am) for that material.

**- OR -**

1 XP per video will be granted if you watch the video **AFTER** class but before the Mastery Exam for that material (11:30pm the evening before).

**Note:** 80% or more of each video must be watched to gain these XPs

**Example:** Each pre-class video for class on September 23 is worth 2 XPs if 80% of the video is watched before 8am on September 23, and only worth 1 XP if 80% of the video is watched before 11:30pm on October 23 (since the class material for September 23 is tested on Mastery Exam 2). If 80% of the video is watched for the first time after October 23, no XPs are awarded.

Pre-class Questions*Description of this activity*

These questions will be found on CAPA in the “First Year Chemistry Lectures – 2022 Fall” course space. You will have 5 attempts per question to get the question correct. Questions are open a minimum of 2 weeks before class, and are **best completed before class**. For example, questions from September 23 will be due at 8am on September 23 before classes start. These questions could also be completed late and used for studying for exams, at a lesser XP value.

*How to gain XPs from this activity?*

Each pre-class homework question is worth 2 XPs for submitting/trying each question **BEFORE** the due date (at 8am before classes begin)

- OR -

Each pre-class homework question is worth 1 XP for submitting/trying each question **AFTER** class before the Mastery Exam for that material (11:30pm the evening before).

**Note:** *an additional 1 XP will be added if the question is answered correctly within 5 tries, regardless of when the question is successfully completed.*

**Example:** A student attempts 3 pre-class homework questions for September 23 on September 22 and 1 pre-class homework question for September 24 on September 26. All 4 questions are answered correctly within 5 tries. Therefore, this student will get  $3 \times 2 + 1 + 4 = 11$  XPs for the September 23 Pre-class questions (This comes from 3 questions attempted on-time + 1 question attempted late + 4 correct responses).

In-Class Engagement Questions*Description of this activity*

These questions will be asked during class time based on the Pre-class videos and questions. Students will be able to submit their response only on the days we have class, either in-class or after class (if participating in the course online). These questions are submitted for grading via MS Forms.

*How to gain XPs from this activity?*

Each in-class engagement question is worth 3 XPs for attempting the question and 2 additional XPs for getting the correct answer **BEFORE** 11:59pm on each class day.

**Note:** *If the question is reflective in nature (i.e. has no right or wrong answer), then all 5 XPs will be awarded for participating in the question.*

**Example:** A student attempts in-class engagement question for September 9, submitting their response at 5pm on September 9. The question is multiple choice and has only 1 correct answer. The student gets the question incorrect, so they will be awarded 3 XPs for the September 9 in-class engagement question.

Post-Topic Checkpoints*Description of this activity*

Post-Topic Checkpoints are timed assessments found on CAPA in the “First Year Chemistry Lectures – 2022 Fall” course space that can be used in order to prepare you for a Mastery Exam. Each checkpoint will consist of 5 questions based on the skills required to be successful in the given topic on an exam. Also, each Checkpoint will be delivered in the “escape room” game style, where correctly answering a question unlocks/opens the next question until the Checkpoint is complete. Once a Checkpoint is started a 45-minute timer will be activated during which time the Checkpoint must be completed. If all questions are answered correctly on the first try, it should take approximately 20 minutes for a Checkpoint to be completed. This timing is comparable to that of a Mastery Exam. Each question within a Checkpoint has 6 tries. Every attempt has a decreasing point value associated with it. For full marks, the question must be answered on the first try. Each subsequent try will see a loss of 0.1 marks per try on that question. This is summarized in full below:

- Answer correctly on the 1<sup>st</sup> try** – 1 out of 1 on the question
- Answer correctly on the 2<sup>nd</sup> try** – 0.9 out of 1 on the question
- Answer correctly on the 3<sup>rd</sup> try** – 0.8 out of 1 on the question
- Answer correctly on the 4<sup>th</sup> try** – 0.7 out of 1 on the question
- Answer correctly on the 5<sup>th</sup> try** – 0.6 out of 1 on the question
- Answer correctly on the 6<sup>th</sup> try** – 0.5 out of 1 on the question

If the question is not correctly answered in the 6 tries, then a grade of 0 will be given on that question and the next question will automatically unlock so students can continue.

*How to gain XPs from this activity?*

Up to 15 XPs per Post-Topic Checkpoint will be awarded based on the following rubric:

Grade out of 5	Number of XPs
4+	15
3-3.9	14
2-2.9	13
1-1.9	12
0.1-0.9	11
0 (but attempted)	10

**Note:** Post-Topic Checkpoints must be completed **BEFORE** 11:30pm the evening before the relevant Mastery Exam.

**Example:** The Post-Topic Checkpoint for Topic 7 must be completed before 11:30pm on November 20, since Topic 7 is evaluated on Mastery Exam 3 occurring on November 21.

Video Game “Boss” Questions*Description of this activity*

Video Game “Boss” questions are found on CAPA in the “First Year Chemistry Lectures – 2022 Fall” course space. These questions are built like mini video game “Worlds” that test your understanding of combined topics, which is different from the Post-Topic Checkpoints which only test the given topic. In each “World” you will have the option to practice your skills by challenging the “Glassware Gang”, or you can skip straight to the end to challenge the Boss. The Boss question at the end is meant to be a challenging question that is at exam level or harder. Therefore, these questions are an excellent tool to use when preparing for Mastery Exams.

*How to gain XPs from this activity?*

35 XPs are awarded for successfully beating the final Boss at the end of each “World” **BEFORE** 11:30pm the evening before the relevant Mastery Exam. Students can skip straight to the Boss and not answer any of the “Glassware Gang” questions to be eligible for these points.

- OR -

If a student is unsuccessful in beating the final Boss at the end of each “World”, 5 XPs will be awarded for attempting the final Boss, and 2 XPs will be awarded for beating each of the 10 Mini-Boss in the “Glassware Gang”, up to a maximum of 25 XPs. All of this must be completed **BEFORE** 11:30pm the evening before the relevant Mastery Exam.

**Note:** *Students have 5 tries to beat each Mini-Boss and 3 tries to beat the final Boss at the end of the “Laboratory World”.*

**Example:** One student attempts the “Doucette Lab” questions on December 1. The student correctly answers 3 of the “Glassware Gang” Mini-Boss questions, then chooses to skip straight to the end Boss. The student then correctly answers the Boss question on the 2<sup>nd</sup> try. The “Doucette Lab” questions all related to Mastery Exam 4 occurring on December 5. So, since the Boss was defeated before 11:30pm on Dec 4 this student will receive 35 XPs.

Another student attempts the “North Lab” questions on September 15. The student correctly answers 7 of the “Glassware Gang” Mini-Boss questions, then chooses to skip straight to the end Boss. The student then attempts the final Boss question but does not correctly it after 3 tries. The “North Lab” questions all related to Mastery Exam 1 occurring on September 26. So, since the Mini-Boss questions were completed, and the Boss was attempted before 11:30pm on September 25 this student will receive  $5 + 7 \times 2 = 19$  XPs for correctly completing 7 Mini-Boss questions and attempting the final Boss.

Practice Exams*Description of this activity*

In order to prepare you for Mastery Exams, there will be a practice exam uploaded to CAPA in the “First Year Chemistry Lectures – 2022 Fall” course space. This practice exam will contain exam-like questions with 1 try each and be timed in a similar way to the Mastery Exam that you complete in person. You are given 3 attempts at each Practice Exam, but only the highest graded attempt count towards XPs.

*How to gain XPs from this activity?*

Up to 50 XPs per Practice Exam will be awarded based on the following rubric:

Grade on Practice Exam	Number of XPs
90-100%	50
80-89%	40
70-79%	35
60-69%	30
50-59%	25
0-49%	20

**Note:** Practice Exams must be completed by 11:30pm the evening **BEFORE** the relevant Mastery Exam to count for XPs. For example, the Mastery 1 Practice Exam must be completed before 11:30pm September 25 since the Mastery Exam 1 occurs on September 26.

**Example:** A student completes the Practice Exam for Mastery Exam 3 twice on November 19. The first time they get a grade of 55%, and the second time they get a grade of 68%. Therefore, the student will receive 30 XPs for attempt 2 as it was completed before the deadline of November 20 at 11:30pm (before Mastery Exam 3 occurs).

Practice CAPA Questions*Description of this activity*

Practice questions are found on CAPA in the “First Year Chemistry Lectures – 2022 Fall” course space. With over 450 individual submissions, use these practice questions to prepare for exams. Each submission has 99 tries and these questions can be completed anytime during the term (due date 11:30pm December 7)

*How to gain XPs from this activity?*

For each practice question 1 XP will be awarded for attempting the question and an additional 1 XP will be awarded for providing the correct answer.

**Example:** Throughout the term a student attempts 100 practice questions and 85% of them are answered correctly. Therefore, the student will earn 185 XPs for the practice questions (100 XP for attempting the questions and 85 XPs for getting the correct answer).

Beyond the Classroom Weekly Reflective Assignments*Description of this activity*

Beyond the Classroom Weekly Reflective Assignments can be found on the “CHEM1011 & CHEM1021 - Concepts in Chemistry I - Lecture - 2022 Fall” 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.

*How to gain XPs from this activity?*

Each assignment that is completed and submitted will be worth 10 XPs if submitted **BEFORE** the deadline (Sundays at 11:30pm before the start of the next week).

- OR -

If the assignment is completed and submitted **AFTER** the deadline, but before the end of term (December 7 at 11:30pm) then 5 XPs will be awarded per assignment.

**Example:** A student submits 6 weekly reflective assignments in total for the term. For weeks 1, 2 and 3 the reflective assignment is submitted on time. For weeks 4, 6 and 7, the student submits the reflective assignment late, but before the end of term. This student would get 45 XPs for the weekly reflective assignment (3 x 10 XP for the on time assignments and 3 x 5 XP for the late assignments).

Syllabus Module*Description of this activity*

Being familiar with the course syllabus is an important part of all of your courses here at Dalhousie. We recognize that our course syllabus is quite large and has a lot of components to it. In the syllabus module you will be quizzed on Sections 1 & 2 of this course syllabus (note: Section 3 on the Laboratory content will be covered separately in the Laboratory Orientation Module). You can find Syllabus Module Quiz on CAPA in the “First Year Chemistry Lectures – 2022 Fall” course space. In addition, videos that further explain the components in the course syllabus can be found on the “CHEM1011 & CHEM1021 - Concepts in Chemistry I - Lecture - 2022 Fall” Brightspace Course Site using the external learning tool Panopto.

*How to gain XPs from this activity?*

Students will be awarded 100 XPs for getting 100% on the Syllabus Module Quiz **BEFORE** the due date of September 20, 11:30pm.

- OR -

If 100% is achieved on the Syllabus Module Quiz **AFTER** the deadline, but before the end of term (December 7 at 11:30pm) then 50 XPs will be awarded.

**Note:** 100% must be achieved on the Syllabus Module Quiz to be awarded any XPs. Grades of less than 100% on this quiz will result in 0 XPs. Each question has 99 tries.

**Example:** A student completes the Syllabus Module Quiz with a grade of 100% on October 3. Therefore, the student will get 50 XPs for completing the module before December 7, but after September 20.

### Academic Integrity Module

#### *Description of this activity*

As with all Universities, Dalhousie University and its members (students, faculty and staff) have a duty to uphold academic integrity principles and be a model for intellectual honesty. As such, Dalhousie University defines academic integrity as

*"being honest in the fulfillment of your academic responsibilities thus establishing mutual trust. Fairness is essential to the interactions of the academic community and is achieved through respect for the opinions and ideas of others"*

as per the Dalhousie University Academic Integrity webpage ([https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)). This website also contains resources for students to use to ensure that they uphold their own academic integrity and be ethical learners, while also upholding the values and standards of each of their courses and Dalhousie University as a whole.

Regardless as to whether a course is delivered in-person or online, academic integrity is always at the forefront of what we do. Therefore, in each of the following sections, we have laid out the rules and regulations that must be followed for each assessment in order to achieve, not only a high level of learning, but also a course with a high level of academic integrity.

Often students in first year who find themselves in an academic misconduct situation do so accidentally by not understanding the full meaning of academic integrity. This is likely because this may be the first time you've truly considered what it means to have academic integrity. Furthermore, this is an issue that will be ever-present during all your time at Dalhousie. Therefore, the Chem 1011/1021 team believes it is important that all students educate themselves on the different types of academic misconduct that a student may find themselves facing. To do this, we are requiring students to complete the Academic Integrity Module, which is prepared by the Dalhousie Writing Centre, and delivered through Brightspace.

All students who enrol in Chem 1011/1021 will automatically also be added to the "First-year Chemistry Writing Centre Academic Integrity Module – Fall 2022" Brightspace Course Site, which will be linked to in the "CHEM1011 & CHEM1021 - Concepts in Chemistry I - Lecture - 2022 Fall" Brightspace Course Site.

#### *How to gain XPs from this activity?*

Students will be awarded 100 XPs for getting 100% on the Academic Integrity Module Quiz **BEFORE** the due date of September 20, 11:30pm.

- OR -

If 100% is achieved on the Academic Integrity Module Quiz **AFTER** the deadline, but before the end of term (December 7 at 11:30pm) then 50 XPs will be awarded.

**Note:** 100% must be achieved on the Academic Integrity Module Quiz to be awarded any XPs. Grades of less than 100% on this quiz will result in 0 XPs. You have an unlimited number of attempts at the Academic Integrity Module Quiz.

**Example:** A student completes the Academic Integrity Module Quiz with a grade of 90% on September 19, and does not reattempt the quiz. Therefore, the student will get 0 XPs for as the Academic Integrity Module is considered “incomplete” as the grade on the Academic Integrity Module Quiz is less than 100%.



### Mastery Points

Mastery points are acquired through Mastery Exams, which will be evaluating the learning objectives of the course. In order to be successful in subsequent courses (for example CHEM1012/1022 and beyond) it is critical that students have mastered the learning objectives in CHEM1011/1021. 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 50% of the course overall. Each Mastery Exam will have a weighting based on student performance on each exam such that:

- The lowest Mastery Exam grade will count for **5% of the final grade**
- The second lowest Mastery Exam grade will count for **10% of the final grade**
- The second highest Mastery Exam grade will count for **15% of the final grade**
- The highest Mastery Exam grade will count for **20% of the final grade**

Therefore, imagine a student had a 90%, 65%, 70% and 80% on the Mastery Exams. The 90% grade would be worth 20% overall ( $0.90 \times 20 \text{ marks} = 18 \text{ marks}$ ). The 80% grade would be worth 15% overall ( $0.80 \times 15 \text{ marks} = 12 \text{ marks}$ ). The 70% grade would be worth 10% overall ( $0.70 \times 10 \text{ marks} = 7 \text{ marks}$ ). The 65% grade would be worth 5% overall ( $0.65 \times 5 \text{ marks} = 3.25 \text{ marks}$ ). Therefore, this student would get 40.25 out of 50 Mastery Points overall (Since,  $18 + 12 + 7 + 3.25 = 40.25$ ).

### 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: Monday, September 26** covering Self-Study A2 & A3 & Topic 1

**Mastery Exam 2: Monday, October 24** covering Topics 2, 3, 4, 5 & 6\*

**Mastery Exam 3: Monday, November 21** covering Topics 7, 8 & 9\*

**Mastery Exam 4: Monday, December 5** covering Topics 10, 11 & 12\*

\*on these exams there will be 1-2 questions 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 for students **registered in in-person sections (Sections 01, 02, 03, 04)**
  - at 7 – 7:50 pm in Scotiabank Auditorium (McCain Arts and Social Sciences Building) for students **registered in the online section (Section 05)**
- 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”** found on the “CHEM1011 & CHEM1021 -

Concepts in Chemistry I - Lecture - 2022 Fall” 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.

### Make-up Mastery Exams

***If you miss a Mastery Exam for any reason you can apply for a make-up Mastery Exam.*** The make-up Mastery Exam for each Exam will happen from 6 – 6:50 pm in Scotiabank Auditorium (McCain Arts and Social Sciences Building) on the following dates:

**Make-up Mastery Exam 1:** Thursday, September 29

**Make-up Mastery Exam 2:** Thursday, October 27

**Make-up Mastery Exam 3:** Thursday, November 24

**Make-up Mastery Exam 4:** Wednesday, December 7

To register for the Make-up Mastery Exam, please fill out one of the First Year Chemistry Student Declaration of Absence (SDA) forms found on the “CHEM1011 & CHEM1021 - Concepts in Chemistry I - Lecture - 2022 Fall” Brightspace Course Site before the Make-up Mastery Exam registration deadline. You will then receive detailed information about the Make-up Mastery Exam as soon as possible after the Make-up Mastery Exam registration deadline has passed. The Make-up Mastery Exam registration deadlines for each Mastery Exam are:

**Make-up Mastery Exam 1 registration deadline:** Wednesday, September 28 at 4 pm

**Make-up Mastery Exam 2 registration deadline:** Wednesday, October 26 at 4 pm

**Make-up Mastery Exam 3 registration deadline:** Wednesday, November 23 at 4 pm

**Make-up Mastery Exam 4 registration deadline:** Tuesday, December 6 at 4 pm

***If you miss a Mastery Exam and its make-up exam entirely for any reason,*** you will receive a 0 on that Mastery Exam. However, students who miss a Mastery Exam entirely will have the opportunity to redo that exam as part of the Mulligan exam.

### Mulligan Exam

During the exam period (December 9-20, 2022) 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 most commonly in golf.

In this spirit, in Chem 1011/1021 the Mulligan Exam is an **optional exam opportunity whereby students will be able to retake any two Mastery Exams**. The Mulligan Exam will be similar, but not identical to the original exam and will be scheduled to last 40 minutes per part. The date and time of the Mulligan Exam will be determined in October based on the full Dalhousie Exam Schedule so there are no conflicts with other exams from other classes.

Therefore, 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. In the event that the Mulligan Exam grade is not an improvement, the original exam grade will remain unchanged.

More information about the details of the Mulligan Exam will be posted to the “CHEM1011 & CHEM1021 – Concepts in Chemistry I – Lecture – 2022 Fall” Brightspace Course Site near the end of the semester.

### Section 3: Laboratory Component



#### **Location:**

Basement of the Chemistry Building  
Room 100-108P

#### **Fall 2022 Lab Schedule:**

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

#### **Labs Begin:**

Monday, September 12<sup>th</sup>, 2022

#### **Contacting Your Lab Instructor:**

The laboratory instructor team communicates with students through one common email address, [chemlab@dal.ca](mailto: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.



Sections: B01, B02, B03, B04, B09, B10

*Dr. Jennifer MacDonald*  
(pronouns: she/her)

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Sections: B05, B06, B22, B23, B51, B52

*Dr. Joshua Bates*  
(pronouns: he/his)

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Sections: B11, B12, B13, B14

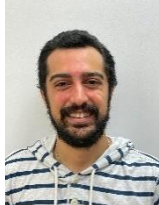
*Dr. Mark Wall*  
(pronouns: he/his)

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Sections: B17, B18, B19, B20, B21, B24, B57,  
B58

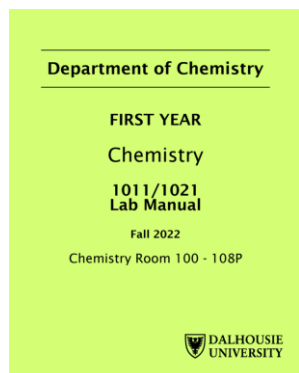
*Adrienne Allison*  
(pronouns: she/her)

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Sections: B07, B08, B15, B16, B53, B54, B55,  
B56

*Joe Weatherby*  
(pronouns: he/his)

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**Required Materials for Lab****Lab Manual**

Available at the Dalhousie Bookstore (~\$24.40 + tax)

**Hardcover Lab Notebook**

Available at the Dalhousie Bookstore (~\$7.99 + tax)

**Safety Glasses**

Must be stamped with standards numbers of: CSA-Z94-3 or ANSI Z87

Available at the Dalhousie Bookstore  
Safety Glasses (PYRAMEX, ~\$4.95 + tax) "OR"  
Safety Glasses For Over Glasses (3M, ~\$5.95 + tax)

**Knee-length Lab Coat (100% cotton)**

Available at the Dalhousie Bookstore (~\$24.95 + tax)

### Laboratory Orientation Module

The Laboratory Orientation Module is a short module/assignment designed to help you become familiar with laboratory format, policies, and procedures, as well as provide students with upfront support for writing lab reports, in particular, purpose/conclusions and recording thorough observations. The Laboratory Orientation Module will focus on Section 3 of the Course Syllabus.

The Laboratory Orientation Module is found in the “CHEM1011 & CHEM1021 – Concepts in Chemistry I – Lab – 2022 Fall” Brightspace Course Site in the content area “Laboratory Orientation and Safety”. At the end of the Laboratory Orientation Module, there will be a short assessment about Section 3 of the Course Syllabus and the writing lab reports content which will be submitted via Microsoft Forms.

Completion of the Laboratory Orientation Module, which is evaluated based on the submission of the Microsoft Forms Assessment at the end, is **worth 1% of the overall final grade**. To receive a grade of 1 out of 1 on the Laboratory Orientation Module, the Laboratory Orientation Module Assessment must be submitted, via Microsoft Forms, by **11:30 pm local Halifax time on Sunday, September 25, 2022**.

Any Laboratory Orientation Module Assessments completed after the due date will not be graded, and partially complete laboratory orientation modules will receive a grade of zero (0).

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

### 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. **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 Modules do not qualify for a make-up lab session.** The Safety Module and Lab Map Content is found in the “CHEM1011 & CHEM1021 – Concepts in Chemistry I – Lab – 2022 Fall” 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 – 2022 Fall course space). Successful completion of the Lab Map Assignment includes completing the virtual laboratory tour on Brightspace and submitting your responses on CAPA. 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, September 25, 2022**.

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.

**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, October 2, 2022**).

Completion of the WHMIS Course Module, which is evaluated based on the submission of your WHMIS Completion Certificate via Microsoft Forms, is **worth 3% of the overall final grade**. To receive a grade of 3 out of 3 on the WHMIS course module, the WHMIS Completion Certificate must be submitted via Microsoft Forms by **11:30 pm local Halifax time on Sunday, October 2, 2022**. **Only the Dalhousie WHMIS Safety Course Completion Certificate will be accepted for credit in Chem 1011/1021.**

Any WHMIS Course Modules completed after the due date will not be graded, and partially complete WHMIS Course Modules and any WHMIS Course Modules that are complete but have not properly submitted the WHMIS Completion Certificate via Microsoft Forms will receive a grade of zero (0).

The First Year Chemistry Team will verify WHMIS Course completions with the Faculty of Open Learning and Career Development.

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.



**Laboratory Format, Expectations and Policies**

You will complete seven 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.

**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:

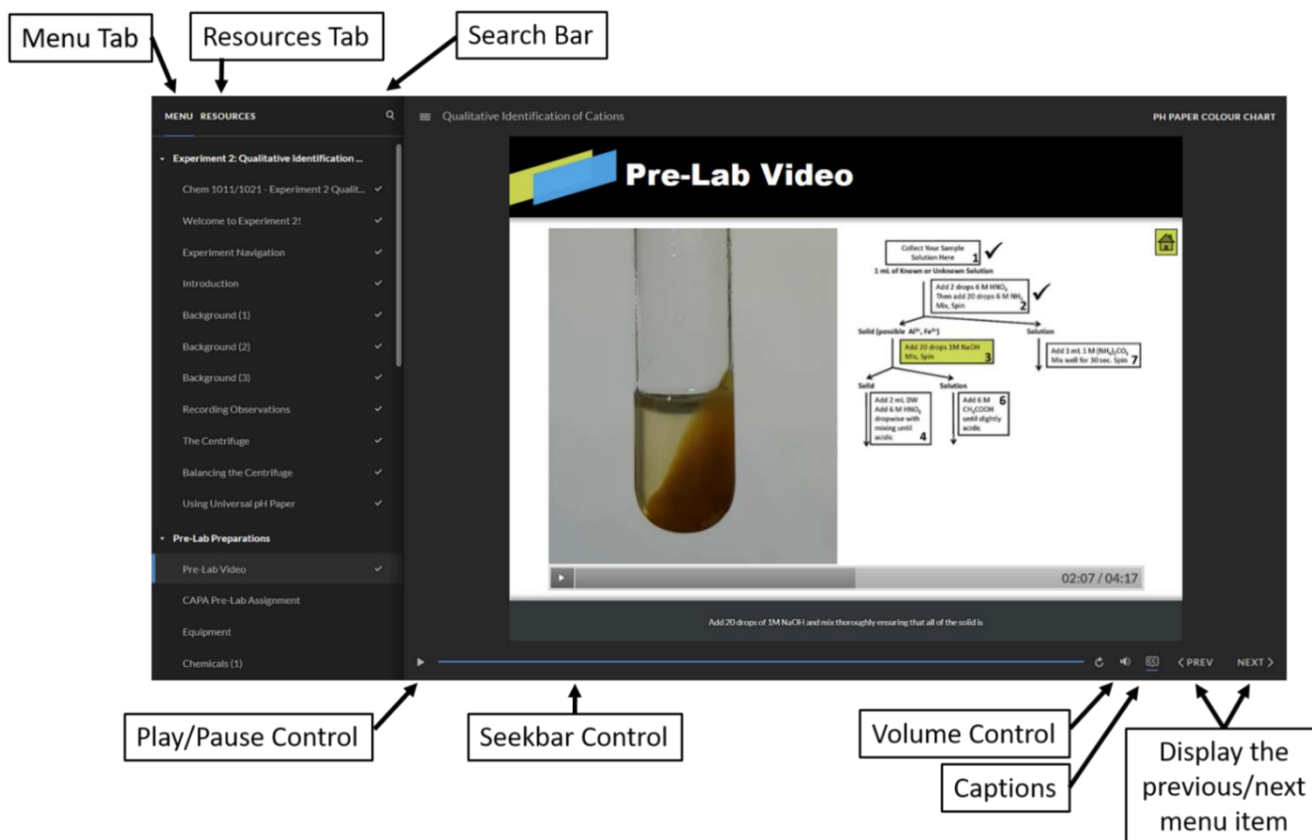
- Date
- Title of Experiment
- Data Tables and Observations from Raw Data Sheet. *If the experiment does not have a Raw Data Sheet, please use the Grade Sheet in your lab manual as a guide to prepare your lab notebook.*

**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, search bar, volume control, closed-captioning control, seekbar, and previous/next navigation buttons. 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, video, captions, seekbar, and previous/next navigation controls.



The screenshot shows a web-based interface for a pre-lab video. On the left is a dark sidebar menu with a search bar at the top. The main area displays a video player with a test tube containing a yellow liquid and a flowchart of experimental steps. Below the video are playback controls including a play/pause button, a seekbar, volume control, a captions icon, and navigation buttons for previous and next menu items.

Labels pointing to the interface elements include:

- Menu Tab
- Resources Tab
- Search Bar
- Play/Pause Control
- Seekbar Control
- Volume Control
- Captions
- Display the previous/next menu item

### 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 refer to the detailed table below for this schedule. Please find **your lab section** and highlight the row to find **your laboratory experiment schedule**.

Sect.	Day	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Exp. 5	Exp. 6	Exp. 7
B01	Mon.	Sept. 12 1:30-3pm	Sept. 19 1:30-4:30pm	Oct. 3 1:30-3pm	Oct. 17 1:30-4:30pm	Oct. 31 1:30-3pm	Nov. 14 1:30-4:30pm	Nov. 28 1:30-3pm
B02	Mon.	Sept. 12 3-4:30pm	Sept. 26 1:30-4:30pm	Oct. 3 3-4:30pm	Oct. 24 1:30-4:30pm	Oct. 31 3-4:30pm	Nov. 21 1:30-4:30pm	Nov. 28 3-4:30pm
B03	Mon.	Sept. 12 2:30-4pm	Sept. 19 2:30-5:30pm	Oct. 3 2:30-4pm	Oct. 17 2:30-5:30pm	Oct. 31 2:30-4pm	Nov. 14 2:30-5:30pm	Nov. 28 2:30-4pm
B04	Mon.	Sept. 12 4-5:30pm	Sept. 26 2:30-5:30pm	Oct. 3 4-5:30pm	Oct. 24 2:30-5:30pm	Oct. 31 4-5:30pm	Nov. 21 2:30-5:30pm	Nov. 28 4-5:30pm
B05	Tues.	Sept. 13 8:30-10am	Sept. 20 8:30-11:30am	Oct. 4 8:30-10am	Oct. 18 8:30-11:30am	Nov. 1 8:30-10am	Nov. 15 8:30-11:30am	Nov. 29 8:30-10am
B06	Tues.	Sept. 13 10-11:30am	Sept. 27 8:30-11:30am	Oct. 4 10-11:30am	Oct. 25 8:30-11:30am	Nov. 1 10-11:30am	Nov. 22 8:30-11:30am	Nov. 29 10-11:30am
B07	Tues.	Sept. 13 2:30-4pm	Sept. 20 2:30-5:30pm	Oct. 4 2:30-4pm	Oct. 18 2:30-5:30pm	Nov. 1 2:30-4pm	Nov. 15 2:30-5:30pm	Nov. 29 2:30-4pm
B08	Tues.	Sept. 13 4-5:30pm	Sept. 27 2:30-5:30pm	Oct. 4 4-5:30pm	Oct. 25 2:30-5:30pm	Nov. 1 4-5:30pm	Nov. 22 2:30-5:30pm	Nov. 29 4-5:30pm
B09	Wed.	Sept. 14 10:30am-12pm	Sept. 21 10:30am-1:30pm	Oct. 5 10:30am-12pm	Oct. 19 10:30am-1:30pm	Nov. 2 10:30am-12pm	Nov. 16 10:30am-1:30pm	Nov. 30 10:30am-12pm
B10	Wed.	Sept. 14 12-1:30pm	Sept. 28 10:30am-1:30pm	Oct. 5 12-1:30pm	Oct. 26 10:30am-1:30pm	Nov. 2 12-1:30pm	Nov. 23 10:30am-1:30pm	Nov. 30 12-1:30pm
B11	Wed.	Sept. 14 1:30-3pm	Sept. 21 1:30-4:30pm	Oct. 5 1:30-3pm	Oct. 19 1:30-4:30pm	Nov. 2 1:30-3pm	Nov. 16 1:30-4:30pm	Nov. 30 1:30-3pm
B12	Wed.	Sept. 14 3-4:30pm	Sept. 28 1:30-4:30pm	Oct. 5 3-4:30pm	Oct. 26 1:30-4:30pm	Nov. 2 3-4:30pm	Nov. 23 1:30-4:30pm	Nov. 30 3-4:30pm
B13	Wed.	Sept. 14 2:30-4pm	Sept. 21 2:30-5:30pm	Oct. 5 2:30-4pm	Oct. 19 2:30-5:30pm	Nov. 2 2:30-4pm	Nov. 16 2:30-5:30pm	Nov. 30 2:30-4pm
B14	Wed.	Sept. 14 4-5:30pm	Sept. 28 2:30-5:30pm	Oct. 5 4-5:30pm	Oct. 26 2:30-5:30pm	Nov. 2 4-5:30pm	Nov. 23 2:30-5:30pm	Nov. 30 4-5:30pm
B15	Thurs.	Sept. 15 8:30-10am	Sept. 22 8:30-11:30am	Oct. 6 8:30-10am	Oct. 20 8:30-11:30am	Nov. 3 8:30-10am	Nov. 17 8:30-11:30am	Dec. 1 8:30-10am
B16	Thurs.	Sept. 15 10-11:30am	Sept. 29 8:30-11:30am	Oct. 6 10-11:30am	Oct. 27 8:30-11:30am	Nov. 3 10-11:30am	Nov. 24 8:30-11:30am	Dec. 1 10-11:30am
B17	Thurs.	Sept. 15 2:30-4pm	Sept. 22 2:30-5:30pm	Oct. 6 2:30-4pm	Oct. 20 2:30-5:30pm	Nov. 3 2:30-4pm	Nov. 17 2:30-5:30pm	Dec. 1 2:30-4pm
B18	Thurs.	Sept. 15 4-5:30pm	Sept. 29 2:30-5:30pm	Oct. 6 4-5:30pm	Oct. 27 2:30-5:30pm	Nov. 3 4-5:30pm	Nov. 24 2:30-5:30pm	Dec. 1 4-5:30pm
B19	Fri.	Sept. 16 1:30-3pm	Sept. 23 1:30-4:30pm	Oct. 7 1:30-3pm	Oct. 21 1:30-4:30pm	Nov. 4 1:30-3pm	Nov. 18 1:30-4:30pm	Dec. 2 1:30-3pm
B20	Fri.	Sept. 16 3-4:30pm	<b>Oct. 14 1:30-4:30pm</b>	Oct. 7 3-4:30pm	Oct. 28 1:30-4:30pm	Nov. 4 3-4:30pm	Nov. 25 1:30-4:30pm	Dec. 2 3-4:30pm
B21	Fri.	Sept. 16 2:30-4pm	Sept. 23 2:30-5:30pm	Oct. 7 2:30-4pm	Oct. 21 2:30-5:30pm	Nov. 4 2:30-4pm	Nov. 18 2:30-5:30pm	Dec. 2 2:30-4pm
B22	Fri.	Sept. 16 10:30am-12pm	Sept. 23 10:30am-1:30pm	Oct. 7 10:30am-12pm	Oct. 21 10:30am-1:30pm	Nov. 4 10:30am-12pm	Nov. 18 10:30am-1:30pm	Dec. 2 10:30am-12pm
B23	Fri.	Sept. 16 12-1:30pm	<b>Oct. 14 10:30am-1:30pm</b>	Oct. 7 12-1:30pm	Oct. 28 10:30am-1:30pm	Nov. 4 12-1:30pm	Nov. 25 10:30am-1:30pm	Dec. 2 12-1:30pm
B24	Fri.	Sept. 16 4-5:30pm	<b>Oct. 14 2:30-5:30pm</b>	Oct. 7 4-5:30pm	Oct. 28 2:30-5:30pm	Nov. 4 4-5:30pm	Nov. 25 2:30-5:30pm	Dec. 2 4-5:30pm
B51	Tues.	Sept. 13 10-11:30am	Sept. 20 10am-1pm	Oct. 4 10-11:30am	Oct. 18 10am-1pm	Nov. 1 10-11:30am	Nov. 15 10am-1pm	Nov. 29 10-11:30am
B52	Tues.	Sept. 13 11:30am-1pm	Sept. 27 10am-1pm	Oct. 4 11:30am-1pm	Oct. 25 10am-1pm	Nov. 1 11:30am-1pm	Nov. 22 10am-1pm	Nov. 29 11:30am-1pm
B53	Tues.	Sept. 13 1-2:30pm	Sept. 20 1-4pm	Oct. 4 1-2:30pm	Oct. 18 1-4pm	Nov. 1 1-2:30pm	Nov. 15 1-4pm	Nov. 29 1-2:30pm
B54	Tues.	Sept. 13 2:30-4pm	Sept. 27 1-4pm	Oct. 4 2:30-4pm	Oct. 25 1-4pm	Nov. 1 2:30-4pm	Nov. 22 1-4pm	Nov. 29 2:30-4pm
B55	Thurs.	Sept. 15 10-11:30am	Sept. 22 10am-1pm	Oct. 6 10-11:30am	Oct. 20 10am-1pm	Nov. 3 10-11:30am	Nov. 17 10am-1pm	Dec. 1 10-11:30am
B56	Thurs.	Sept. 15 11:30am-1pm	Sept. 29 10am-1pm	Oct. 6 11:30am-1pm	Oct. 27 10am-1pm	Nov. 3 11:30am-1pm	Nov. 24 10am-1pm	Dec. 1 11:30am-1pm
B57	Thurs.	Sept. 15 1-2:30pm	Sept. 22 1-4pm	Oct. 6 1-2:30pm	Oct. 20 1-4pm	Nov. 3 1-2:30pm	Nov. 17 1-4pm	Dec. 1 1-2:30pm
B58	Thurs.	Sept. 15 2:30-4pm	Sept. 29 1-4pm	Oct. 6 2:30-4pm	Oct. 27 1-4pm	Nov. 3 2:30-4pm	Nov. 24 1-4pm	Dec. 1 2:30-4pm

### Pre-Lab CAPA Assignments

All pre-lab assignments will be hosted on the online learning platform, CAPA in the First Year Chemistry Labs – 2022 Fall 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.

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%.**

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 Sept 12, 2022 at 1:30 PM, their pre-lab would be due on Sept. 12, 2022 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 (online and in-person experiments) 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%.**

**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. 1	Exp. 2	Exp. 3	Exp. 4	Exp. 5	Exp. 6	Exp. 7
B01	Sept. 19, 1:30pm	Sept. 19, 4:30pm	Oct. 17, 1:30pm	Oct. 31, 1:30pm	Oct. 31, 3:00pm	Nov. 28, 1:30pm	Nov. 28, 3:00pm
B02	Sept. 26, 1:30pm	Sept. 26, 4:30pm	Oct. 24, 1:30pm	Oct. 31, 3:00pm	Oct. 31, 4:30pm	Nov. 28, 3:00pm	Nov. 28, 4:30pm
B03	Sept. 19, 2:30pm	Sept. 19, 5:30pm	Oct. 17, 2:30pm	Oct. 31, 2:30pm	Oct. 31, 4:00pm	Nov. 28, 2:30pm	Nov. 28, 4:00pm
B04	Sept. 26, 2:30pm	Sept. 26, 5:30pm	Oct. 24, 2:30pm	Oct. 31, 4:00pm	Oct. 31, 5:30pm	Nov. 28, 4:00pm	Nov. 28, 5:30pm
B05	Sept. 20, 8:30am	Sept. 20, 11:30am	Oct. 18, 8:30am	Nov. 1, 8:30am	Nov. 1, 10:00am	Nov. 29, 8:30am	Nov. 29, 10:00am
B06	Sept. 27, 8:30am	Sept. 27, 11:30am	Oct. 25, 8:30am	Nov. 1, 10:00am	Nov. 1, 11:30am	Nov. 29, 10:00am	Nov. 29, 11:30am
B07	Sept. 20, 2:30pm	Sept. 20, 5:30pm	Oct. 18, 2:30pm	Nov. 1, 2:30pm	Nov. 1, 4:00pm	Nov. 29, 2:30pm	Nov. 29, 4:00pm
B08	Sept. 27, 2:30pm	Sept. 27, 5:30pm	Oct. 25, 2:30pm	Nov. 1, 4:00pm	Nov. 1, 5:30pm	Nov. 29, 4:00pm	Nov. 29, 5:30pm
B09	Sept. 21, 10:30am	Sept. 21, 1:30pm	Oct. 19, 10:30am	Nov. 2, 10:30am	Nov. 2, 12:00pm	Nov. 30, 10:30am	Nov. 30, 12:00pm
B10	Sept. 28, 10:30am	Sept. 28, 1:30pm	Oct. 26, 10:30am	Nov. 2, 12:00pm	Nov. 2, 1:30pm	Nov. 30, 12:00pm	Nov. 30, 1:30pm
B11	Sept. 21, 1:30pm	Sept. 21, 4:30pm	Oct. 19, 1:30pm	Nov. 2, 1:30pm	Nov. 2, 3:00pm	Nov. 30, 1:30pm	Nov. 30, 3:00pm
B12	Sept. 28, 1:30pm	Sept. 28, 4:30pm	Oct. 26, 1:30pm	Nov. 2, 3:00pm	Nov. 2, 4:30pm	Nov. 30, 3:00pm	Nov. 30, 4:30pm
B13	Sept. 21, 2:30pm	Sept. 21, 5:30pm	Oct. 19, 2:30pm	Nov. 2, 2:30pm	Nov. 2, 4:00pm	Nov. 30, 2:30pm	Nov. 30, 4:00pm
B14	Sept. 28, 2:30pm	Sept. 28, 5:30pm	Oct. 26, 2:30pm	Nov. 2, 4:00pm	Nov. 2, 5:30pm	Nov. 30, 4:00pm	Nov. 30, 5:30pm
B15	Sept. 22, 8:30am	Sept. 22, 11:30am	Oct. 20, 8:30am	Nov. 3, 8:30am	Nov. 3, 10:00am	Dec. 1, 8:30am	Dec. 1, 10:00am
B16	Sept. 29, 8:30am	Sept. 29, 11:30am	Oct. 27, 8:30am	Nov. 3, 10:00am	Nov. 3, 11:30am	Dec. 1, 10:00am	Dec. 1, 11:30am
B17	Sept. 22, 2:30pm	Sept. 22, 5:30pm	Oct. 20, 2:30pm	Nov. 3, 2:30pm	Nov. 3, 4:00pm	Dec. 1, 2:30pm	Dec. 1, 4:00pm
B18	Sept. 29, 2:30pm	Sept. 29, 5:30pm	Oct. 27, 2:30pm	Nov. 3, 4:00pm	Nov. 3, 5:30pm	Dec. 1, 4:00pm	Dec. 1, 5:30pm
B19	Sept. 23, 1:30pm	Sept. 23, 4:30pm	Oct. 21, 1:30pm	Nov. 4, 1:30pm	Nov. 4, 3:00pm	Dec. 2, 1:30pm	Dec. 2, 3:00pm
B20	<b>Oct. 3, 1:30pm*</b>	<b>Oct. 14, 4:30pm</b>	Oct. 28, 1:30pm	Nov. 4, 3:00pm	Nov. 4, 4:30pm	Dec. 2, 3:00pm	Dec. 2, 4:30pm
B21	Sept. 23, 2:30pm	Sept. 23, 5:30pm	Oct. 21, 2:30pm	Nov. 4, 2:30pm	Nov. 4, 4:00pm	Dec. 2, 2:30pm	Dec. 2, 4:00pm
B22	Sept. 23, 10:30am	Sept. 23, 1:30pm	Oct. 21, 10:30am	Nov. 4, 10:30am	Nov. 4, 12:00pm	Dec. 2, 10:30am	Dec. 2, 12:00pm
B23	<b>Oct. 3, 1:30pm*</b>	<b>Oct. 14, 1:30pm</b>	Oct. 28, 10:30am	Nov. 4, 12:00pm	Nov. 4, 1:30pm	Dec. 2, 12:00pm	Dec. 2, 1:30pm
B24	<b>Oct. 3, 1:30pm*</b>	<b>Oct. 14, 5:30pm</b>	Oct. 28, 2:30pm	Nov. 4, 4:00pm	Nov. 4, 5:30pm	Dec. 2, 4:00pm	Dec. 2, 5:30pm
B51	Sept. 20, 10:00am	Sept. 20, 1:00pm	Oct. 18, 10:00am	Nov. 1, 10:00am	Nov. 1, 11:30am	Nov. 29, 10:00am	Nov. 29, 11:30am
B52	Sept. 27, 10:00am	Sept. 27, 1:00pm	Oct. 25, 10:00am	Nov. 1, 11:30am	Nov. 1, 1:00pm	Nov. 29, 11:30am	Nov. 29, 1:00pm
B53	Sept. 20, 1:00pm	Sept. 20, 4:00pm	Oct. 18, 1:00pm	Nov. 1, 1:00pm	Nov. 1, 2:30pm	Nov. 29, 1:00pm	Nov. 29, 2:30pm
B54	Sept. 27, 1:00pm	Sept. 27, 4:00pm	Oct. 25, 1:00pm	Nov. 1, 2:30pm	Nov. 1, 4:00pm	Nov. 29, 2:30pm	Nov. 29, 4:00pm
B55	Sept. 22, 10:00am	Sept. 22, 1:00pm	Oct. 20, 10:00am	Nov. 3, 10:00am	Nov. 3, 11:30am	Dec. 1, 10:00am	Dec. 1, 11:30am
B56	Sept. 29, 10:00am	Sept. 29, 1:00pm	Oct. 27, 10:00am	Nov. 3, 11:30am	Nov. 3, 1:00pm	Dec. 1, 11:30am	Dec. 1, 1:00pm
B57	Sept. 22, 1:00pm	Sept. 22, 4:00pm	Oct. 20, 1:00pm	Nov. 3, 1:00pm	Nov. 3, 2:30pm	Dec. 1, 1:00pm	Dec. 1, 2:30pm
B58	Sept. 29, 1:00pm	Sept. 29, 4:00pm	Oct. 27, 1:00pm	Nov. 3, 2:30pm	Nov. 3, 4:00pm	Dec. 1, 2:30pm	Dec. 1, 4:00pm

\*The Exp. 1 Post-Lab Submission Deadline for B20, B22, B24 is Oct. 3 before 1:30 PM. There will be a drop box outside of the First Year Chemistry Lab to collect reports.

**Post-Lab Report Weighting Scheme**

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

Experiment 1:	1.5 %
Experiment 2:	2.5 %
Experiment 3:	1.5%
Experiment 4:	2.5 %
Experiment 5:	2.0 %
Experiment 6:	3.0 %
Experiment 7:	2.0 %
<b>Total:</b>	<b>15%</b>

### 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

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:

1. course number
2. lab section (e.g. B01)

Body of your message:

1. your name
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!**

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.

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.

**Final Dates for Make-up Experiments and Late Work Submissions**

Exp.	Last Opportunity for Make-up Lab		Late Work Submission Deadline
	Group A	Group B	ALL Groups
1	Sept. 23	Sept. 23	Oct. 3 <b>before</b> 1:30pm
2	Sept. 29	Oct. 7	<i>In-lab submission only</i>
3	Oct. 21	Oct. 21	Oct. 31 <b>before</b> 1:30pm
4	Oct. 28	Nov. 4	Nov. 14 <b>before</b> 1:30pm
5	Nov. 18	Nov. 18	<i>In-lab submission only</i>
6	Nov. 25	Dec. 2	Dec. 5 <b>before</b> 1:30pm
7	Dec. 2	Dec. 2	<i>In-lab submission only</i>

**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 1011/1021 in Fall 2022 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 2023, Fall 2023, and Summer 2024. 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 in order to apply for a lab exemption.

**Section 4: Concept Room & Chemistry Resource Centre**

The **Concept Room** is staffed by members of the First Year Chemistry Lecture team who are available to answer lecture content and CAPA assignment questions and members of the First Year Chemistry Lab team who are available to answer lab content and CAPA Pre-Lab Assignment questions.

The **Chemistry Resource Centre** is staffed by advanced undergraduate students (Resource Centre Assistants; **RCAs**) who can assist you with CAPA assignments, pre-lab and post-lab questions.

Typically, there is some staff (either in the *Concept Room* or the Chemistry Resource Centre) available to help you from 10am – 5pm 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 “CHEM1011 & CHEM1021 – Concepts in Chemistry I – Lecture – 2022 Fall” and “CHEM1011 & CHEM1021 – Concepts in Chemistry I – Lab – 2022 Fall” Brightspace course sites in the “Concept Room & Resource Centre” content area.

## **Section 5: Course Content & Learning Objectives**

### **Course Description**

Credit Hours: 3

The electronic structures of atoms and molecules are used to explain the reactivity and properties of chemicals. Topics include atomic structure, bonding models, structure and shape of molecules and ions, and acid/base chemistry.

It is recommended that students have Nova Scotia grade 12 chemistry or equivalent before taking this course.

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 orbitals and molecules using atomic and bonding theories.
- Predict, compare and explain properties of atoms and molecules using electronic and energetic arguments.
- Demonstrate understanding of laboratory safety and laboratory techniques including pipetting, titrating, and centrifuging.
- Analyze and interpret observations and data to arrive at experiment conclusions.
- Report laboratory observations and data in an organized and logical manner.



**Course Content***Self-Study A1: Mathematics in Chemistry*

Accuracy and Precision  
Significant Figures  
Multiple Measurements: Averages and Standard Deviations  
Logarithms/Mathematics and Chemistry  
Solving Problems Using Dimensional Analysis

*Self-Study A2: Introduction to Chemistry*

Element Names and Symbols  
Cations, Anions and Regions of the Periodic Table  
Naming Inorganic Compounds (Nomenclature)  
Fundamental Units of Measurement for Chemistry  
Molecules, Molecular Formulae, Molecular Mass and Formula Mass  
The Mole, Avogadro's Number and Molar Mass  
Writing Chemical Equations  
Procedure for Balancing Chemical Equations  
Stoichiometry and Mass  
Determining the Limiting Reagent  
Actual, Theoretical, and Percent Yield

*Self-Study A3: Quantitative Description of Aqueous Solutions*

General Characteristics of Aqueous Solutions  
Solution Concentration including molarity, mole fraction and mass percent  
Dilution  
Reactions Involving Aqueous Solutions  
Dissociation and Net Ionic Equations

*Topic 1: Atomic Structure and Line Spectra*

Subatomic Particles  
Mass Number, Isotopes, and Average Atomic Mass  
Electromagnetic Radiation: A Useful Probe of Atomic Structure  
Atomic Line Spectra and the Bohr Model

*Topic 2: Quantum Numbers and Electron Configurations*

Quantum Numbers  
Shapes of Atomic Orbitals  
Pauli Exclusion Principle and Hund's Rule  
Relative Energies of Atomic Orbitals (Aufbau Principle)  
Electron Configurations including Valence and Core configurations

*Topic 3: Periodic Properties of the Elements*

Effective Nuclear Charge  
Atomic Size  
The Size of Ions  
Ionization Energy  
Electron Affinity  
Electronegativity  
Solid State Properties: Metals, Metalloids, and Non-Metals

*Topic 4: An Introduction to Chemical Bonding*

Electrostatic Interactions and Ionic Bonding  
Covalent Bonding

*Topic 5: The Lewis Bonding Theory*

Lewis Structures  
Procedure for Drawing Lewis Structures  
Lewis Structures for Structural Isomers  
Resonance, Energy Equivalent Structures, and "Curly Arrows"  
Limitations of the Lewis Bonding Model

*Topic 6: Molecular Structure and VSEPR Theory*

The Principles of the VSEPR Model  
Procedure for Predicting Molecular Shape

*Topic 7: Polarity and Intermolecular Interactions*

Electronegativity and Bond Polarity  
Molecular Polarity and Dipole Moment  
Non-covalent Intermolecular and Inter-ion Interactions  
Thin-layer and Column Chromatography

*Topic 8: Valence Bond Theory and Hybridization*

$\sigma$  Bonds (Sigma Bonds)  
Hybridizing Atomic Orbitals to Make  $\sigma$  Bonds  
Unhybridized p Orbitals and  $\pi$  Bonds (Pi Bonds)  
Hybridization in Compounds Containing Heavy Elements  
Compounds Involving Lone Pairs in Hybrid Orbitals

*Topic 9: Molecular Orbital Theory*

Delocalized Electron Model  
Molecular Orbital Diagram for Dihydrogen  
Second Row Diatomic Molecules

*Topic 10: Qualitative View of Acid-Base Equilibria in Aqueous Solution*

Strong Acids and Bases  
Weak Acids and Weak Bases  
The Equilibrium Constant  
Auto-dissociation of Water  
 $pK_a$  and  $pK_b$   
Polyprotic Acids  
Structural Influences on the Magnitude of  $pK_a$  or  $pK_b$

*Topic 11: Quantitative View of Acid-Base Equilibria in Aqueous Solution*

pH and pOH  
Acid-Base Reactions  
Titrations Involving Strong Acids and Strong Bases  
Determining the pH for Solutions of Weak Acids and Weak Bases  
Solutions of Acidic and Basic Salts

*Topic 12: Applications of Acid-Base Equilibria: Buffer Solutions*

Buffer Solutions from a Weak Acid and Its Conjugate Base  
Henderson-Hasselbalch Equation  
Buffering Action  
Buffer Solutions from Weak Acids (Bases) and Strong Bases (Acids)  
Preparation of Buffer Solutions of a Desired pH

**Laboratory Experiments**

Exp. 1 – Relative Solubilities & Limiting Reagents  
Exp. 2 – Qualitative Identification of the Cations  
Exp. 3 – Using Indicators to Distinguish Acidic, Basic, and Neutral Solutions  
Exp. 4 – Laboratory Techniques  
Exp. 5 – Bonding Theories and Molecular Models  
Exp. 6 – Acid/Base Titrations  
Exp. 7 – Investigating  $pK_a$  of Weak Acid, Buffer Preparation, and Buffer Capacity

## **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](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](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](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](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](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](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](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](https://www.dal.ca/campus_life/communities/indigenous.html)

*Black Students Advising Centre:* [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

*International Centre:* [https://www.dal.ca/campus\\_life/international-centre/current-students.html](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](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](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](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](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>