

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

Welcome to Chemistry 1012/1022 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.

Table of Contents

Section 1: General Course Information	4
Who to Contact?	4
Mode of Delivery	4
Important Academic Dates.....	5
Chemistry 1012/1022 Grading Scheme	6
Dalhousie Common Grading Scheme	7
Frequently Asked Question: How do I email an Instructor/Professor?.....	8
Frequently Asked Question: How do I access CAPA?.....	9
Frequently Asked Question: What happens if the course gets interrupted?	9
Frequently Asked Question: What should I do if I become sick during term?	9
Section 2: Lecture Component.....	10
Required Lecture Materials.....	10
Lecture Teaching Team.....	11
Lecture/Class Schedule	12
Syllabus Module	14
Academic Integrity Module.....	14
Chemistry Skills Inventory Self Assessment Module	15
Beyond the Classroom Reflective Assignments	16
Guest Lecture Reflections.....	16
Experience Points.....	17
Pre-class Questions	17
In-Class Engagement Questions	18
Post-Topic Checkpoints.....	18

Practice Exams.....	19
Mastery Points.....	20
Mastery Exams.....	20
Mastery Exam Storm Closure Policy.....	21
Make-up Mastery Exams.....	21
Mulligan Exam.....	21
Section 3: Laboratory Component.....	22
Laboratory Instructors.....	23
Required Materials for Lab.....	24
Laboratory Orientation Module.....	25
Safety Module and Lab Map.....	26
WHMIS Course Module.....	27
Laboratory Format, Expectations and Policies.....	28
Before Your Experiment.....	28
Theory and Pre-Lab Support Module Structure.....	28
During Your Experiment.....	29
After Your Experiment.....	29
Laboratory Schedule.....	30
Pre-Lab CAPA Assignments.....	31
Preparedness.....	31
Participation: Data Collection and Raw Data Submission.....	31
Post-Lab Due Dates.....	32
Post-Lab Report Weighting Scheme.....	32
Time Management.....	33
Missed Labs and Make-up Experiments.....	33
Final Dates for Make-up Experiments and Late Work Submissions.....	34
Laboratory Exemptions.....	34
Section 4: <i>Concept</i> Room & Chemistry Resource Centre.....	35
Section 5: Course Content & Learning Objectives.....	35
Course Description.....	35
Course Objectives and Goals.....	35
Course Learning Outcomes.....	36
Course Content.....	37

Laboratory Experiments.....	40
Section 6: University Policies and Statements	41
Academic Integrity	41
Accessibility	41
Student Code of Conduct.....	41
Recognition of Mi'kmaq Territory	41
Important Dates in the Academic Year (including add/drop dates).....	42
University Grading Practices.....	42
Section 7: University-wide Student Resources and Support.....	43
Advising	43
Academic supports	43
Other supports and services	43
Safety.....	43
Scent-Free Program	43
Dalhousie COVID-19 information and updates	43

Section 1: General Course Information

Who to Contact?

If you have questions about Chem 1012/1022 please do not hesitate to contact one of the First Year Chemistry Coordinators. The best way to contact the First Year Chemistry Coordinators is by **email**. 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

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



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

Email: chemlect@dal.ca

Please note, chemistry content related questions should be directed to the assortment of instructors, professors and teaching assistants (TAs) available to meet with students in the *Concept Room* 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 students will likely get a much faster response in the *Concept Room* or Resource Centre. However, don't worry, we have plenty of staff to help students throughout the course!

Mode of Delivery

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

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

Important Academic Dates

Monday, January 8, 2024

Winter term classes begin

Monday, January 22, 2024

Last day to add or drop a Winter term course

Friday, February 2, 2024

Munro Day – University closed

Tuesday, February 6, 2024

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

Monday, February 19 – Friday, February 23, 2024

Winter Study Break – no classes

Monday, February 19, 2024

Nova Scotia Heritage Day – University closed

Wednesday, March 6, 2024

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

Friday, March 29, 2024

Good Friday – University closed

Monday, April 8, 2024

Follows the Friday schedule

Tuesday, April 9, 2024

Last day of Fall term classes – Follows the Friday schedule

Thursday, April 11 – Tuesday, April 23, 2024

Winter term exam period

Chemistry 1012/1022 Grading Scheme

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

*Lecture Component:*Homework Assignments

Syllabus Module	1%
Academic Integrity Module	1%
Chemistry Skills Inventory Self Assessment Module	1%
Beyond the Classroom Reflective Assignments	1%
Guest Lecture Reflections	1%
Experience Points (CAPA & In-class Assignments)	5%

Mastery Points

Four (4) Mastery Exams	60%
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*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 1012/1022, students must meet **ALL** of the following criteria:

- Obtain a grade of at least 30/60 on the “Mastery Points” portion of the course.
- Obtain a grade of at least 15.00/30 on the “Laboratory Component” of the course with 12.50/25 from “Lab Work.”
- Obtain a total combined grade of at least 50/100.

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

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

Dalhousie Common Grading Scheme

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

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

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

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

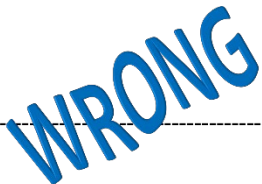
For more information about Dalhousie University's Grading Practices, please refer to:
https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

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

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

When emailing an instructor/professor, please remember to:

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

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

Frequently Asked Question: How do I access CAPA?

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

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

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

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

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

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

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

Section 2: Lecture Component

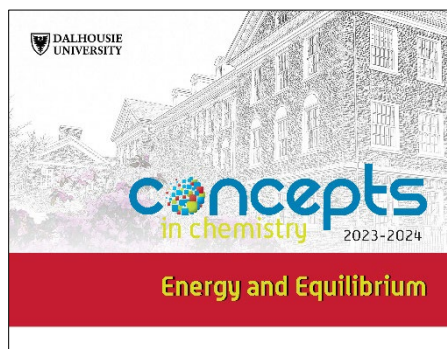
Required Lecture Materials

Course Textbook

Concepts in Chemistry: Energy and Equilibrium (2023–24 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 as a hard/paper copy at the Dalhousie Bookstore only.



Non-programmable Scientific Calculator

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

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

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

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



CASIO fx-991ES PLUS



SHARP EL-510RTB

Lecture Teaching Team



Ryan Snitynsky
(pronouns: he/him)

Learning Facilitator

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

8:35 – 9:25am MWF

CHEM 1022 section 01

CHEM 1012 section 03

9:35 – 10:25am MWF

CHEM 1022 section 02

Concept Room



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

Learning Facilitator

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

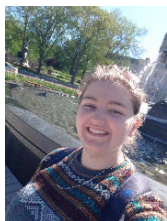
9:35 – 10:25am MWF

CHEM 1012 section 01

10:35 – 11:25am MWF

CHEM 1012 section 02

Concept Room

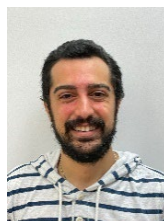


Sam Knight
(she/her)

General Lecture Support**Concept Room**



Sarrah Putwa
(pronouns: she/her)

Concept Room

Joe Weatherby
(he/him)

Concept Room

Lecture/Class Schedule

Date	Class Information	Please be familiar with these textbook sections...
Mon., Jan 8	Welcome and Introduction	The course syllabus + Chem 1011/1021 Review
Wed., Jan 10	Topic 13 – Ideal Gases	Sections 13.1 – 13.8 (pages 52-71)
Fri., Jan 12	Topic 14 – Chemical Equilibria	Sections 14.1 – 14.4 (pages 75-85)
Mon., Jan 15	Topic 14 – Chemical Equilibria	Sections 14.5 – 14.7 (pages 86-96)
Wed., Jan 17	Topic 15 – First Law Basics	Sections 15.1 – 15.4 & 15.8 – 15.9 (pages 100-102 & 108-113)
Fri., Jan 19	Topic 15 – Work	Section 15.7 (pages 107-108)
Mon., Jan 22	Topic 15 – Heat & Calorimetry	Sections 15.5 – 15.6 & 15.10 – 15.13 (pages 103-106 & 114-123)
Wed., Jan 24	Guest Lectures	No readings to prepare for this class
Fri., Jan 26	Mastery Exam 1	Covers Topic 13 & 14
Mon., Jan 29	Topic 16 – Enthalpy & Hess' Law	Sections 16.1 – 16.5 (pages 127-134)
Wed., Jan 31	Topic 16 – Abbreviated Hess' Law & Approximations to Hess' Law	Sections 16.6 – 16.9 (pages 135-149)
Fri., Feb 2	<i>Munro Day; No classes, University open</i>	
Mon., Feb 5	Topic 17 – Entropy, a qualitative approach	Sections 17.1 – 17.4 (pages 152-159)
Wed., Feb 7	Topic 17 – Entropy, a quantitative approach	Sections 17.5 – 17.7 (pages 160-170)
Fri., Feb 9	Topic 18 – Gibb's Energy of Systems in their Standard State	Sections 18.1 – 18.5 (pages 173-183)
Mon., Feb 12	Mastery Exam 2	Covers Topic 15, 16 & 17
Wed., Feb 14	Guest Lectures	No readings to prepare for this class
Fri., Feb 16	Topic 18 – Gibb's Energy of Systems in Non-Standard States	Sections 18.6 – 18.8 (pages 184-189)
Mon., Feb 19	<i>NS Heritage Day; No classes, University closed</i>	
Wed., Feb 21	<i>Study Break; No classes, University open</i>	
Fri., Feb 23	<i>Study Break; No classes, University open</i>	

Continued...

Date	Class Information	Please be familiar with these textbook sections...
Mon., Feb 26	Topic 19 – Redox Reactions	Sections 19.1 – 19.7 (pages 190-203)
Wed., Feb 28	Topic 20 – Electrochemical Cells in their Standard State	Sections 20.1 – 20.6 (pages 206-217)
Fri., Mar 1	Topic 20 – Electrochemical Cells in Non-Standard States	Sections 20.7 – 20.8 (pages 218-224)
Mon., Mar 4	Topic 21 – Organic Naming part 1	Sections 21.1 – 21.7 (pages 227-246)
Wed., Mar 6	Topic 21 – Organic Naming part 2	Sections 21.8 – 21.11 (pages 247-252)
Fri., Mar 8	Topic 21 – Organic Isomers	Sections 21.12-21.13 (pages 253-260)
Mon., Mar 11	Mastery Exam 3	Covers Topic 18, 19 & 20
Wed., Mar 13	Guest Lectures	No readings to prepare for this class
Fri., Mar 15	Topic 22 – UV-Vis and IR Spectroscopy	Sections 22.1 – 22.4 (pages 265-274)
Mon., Mar 18	Topic 22 – ¹³ C-NMR Spectroscopy	Sections 22.5 – 22.7 (pages 275-285)
Wed., Mar 20	Topic 23 – S _N 2 Reactions	Sections 23.1 – 23.4 (pages 287-292)
Fri., Mar 22	Topic 23 – Diels Alder & Li Addition Reactions	Sections 23.5 – 23.7 (pages 293-299)
Mon., Mar 25	Topic 24 – Average Rates	Sections 24.1 – 24.3 (pages 300-305)
Wed., Mar 27	Topic 24 – Rate Laws	Sections 24.4 – 24.5 (pages 306-312)
Fri., Mar 29	Good Friday; No classes, University closed	
Mon., Apr 1	Topic 24 – Integrated Rate Laws	Sections 24.6 – 24.9 (pages 313-320)
Wed., Apr 3	Topic 25 – Reaction Coordination Diagrams	Sections 25.1 – 25.3 (pages 323-327)
Fri., Apr 5	Topic 25 – Factors Affecting Rates	Sections 25.4 – 25.7 (pages 328-339)
Mon., Apr 8	Friday's Schedule: Review for Exam	No readings to prepare for this class
Tues., Apr 9	Friday's Schedule: Mastery Exam 4	Covers Topic 21, 22, 23, 24 & 25

Syllabus Module

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 the Syllabus Module Quiz on CAPA in the "First Year Chemistry Lectures – 2024 Winter" course space.

Students will be awarded 1% in the course for getting 100% on the Syllabus Module Quiz on CAPA BEFORE the due date of Thursday, January 25, 11:30pm.

Note: 100% must be achieved on the Syllabus Module Quiz to be awarded the 1% grade. Grades of less than 100% on this quiz will result in 0% on this course activity. You have 99 tries per question on the Syllabus Module Quiz to achieve 100%.

Academic Integrity Module

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). 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 1012/1022 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 – 2023-2024” Brightspace Course Site, which will be linked to in the “CHEM1012 & CHEM1022 - Concepts in Chemistry II - Lecture – 2024 Winter” Brightspace Course Site under the content area “Academic Integrity Module”.

Students will be awarded 1% in the course for getting 100% on the Academic Integrity Module Final Module Quiz *BEFORE* the due date of Thursday, January 25, 11:30pm.

Note 1: *Be careful* – most students are enrolled in multiple different versions of the Academic Integrity Module. The only one graded by Chem 1012/1022 is the one directly linked to the “CHEM1012 & CHEM1022 - Concepts in Chemistry II - Lecture – 2024 Winter” Brightspace Course Site called “*First-Year Chemistry Writing Centre Academic Integrity Module – 2023-2024*”.

Note 2: 100% must be achieved on the Academic Integrity Module Final Module Quiz to be awarded the 1% grade. Grades of less than 100% on this quiz will result in 0% on this course activity. You have unlimited attempts on the Academic Integrity Module Final Module Quiz to achieve 100%.

Note 3: If you completed the correct version of the Academic Integrity Module during the Fall 2023 semester, your grade will carry forward to the Winter 2024 semester.

Chemistry Skills Inventory Self Assessment Module

The Chemistry Skills Inventory Self Assessment Module can be found on CAPA in the “First Year Chemistry Lectures – 2024 Winter” course space. This Self Assessment Module is completed at the beginning of the term, and again at the end. It contains questions from all Topics in Chem 1012/1022. Some of these topics you may have seen in previous high school chemistry classes, while others may be brand new. ***You are meant to do the module without studying, just from what you remember from previous chemistry experiences.***

The assessment is 25 questions and is timed for 4 hours to give you plenty of time to complete it. Students have 1 attempt per question, much like a test or exam. The grade you get on the Self Assessment will appear in CAPA and is for you only; please use this to assess your chemistry knowledge when you first enter the course, and then again after taking the course. For the pre-term assessment, do not worry if you cannot answer the questions – we will learn these things this term! At the end of the term, you should be able to answer all of the questions, and we hope you will be pleased to see how much you have improved and learned!

Grading of the Chemistry Skills Inventory Self Assessment Module on CAPA is based on completion of the module only. **Students who complete (i.e. answer all 25 questions) will receive 0.5 marks for each of the pre-term and post-term Chemistry Skills Inventory Self Assessment Modules, for a total of 1% of the course overall**, regardless of the grade received on the module.

The Chemistry Skills Inventory Self Assessment Module on CAPA is open and available for completion during the following times:

	Opening Date	Due Date (at 11:30pm)
Pre-term Module	Mon., Jan. 8	Thurs., Jan. 25
Post-term Module	Mon., Mar. 25	Tues., Apr. 9

Beyond the Classroom Reflective Assignments

Beyond the Classroom Reflective Assignments can be found on the “CHEM1012 & CHEM1022 - Concepts in Chemistry II - Lecture – 2024 Winter” Brightspace Course Site and are submitted via MS Forms. These assignments are an opportunity for students to reflect on their learning, and how they learn, outside of the classroom.

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

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

Assignment	Theme	Due Date (at 11:30pm)
1	Your Scientific Identity	Fri., Jan. 19
2	News vs. Literature	Fri., Feb. 2
3	Exam Wrapper	Fri., Feb. 16
4	Explain it like I'm 5	Fri., Mar. 8
5	“Dear Gabby” – responding to misinformation	Fri., Mar. 22
6	Named Reactions	Fri., Apr. 5

Guest Lecture Reflections

Throughout the term, there will be 3 Guest Lectures. While this content is not examinable, exposure to and reflection on research talks in the sciences at the first-year level is a valuable experience. After each Guest Lecture, students will have a reflective assignment to complete. While some time will be given in class for completing these assignments, they will be open until 12pm (noon) the day following the Guest Lectures. **Students are expected to attend the presentations and complete a minimum of 2 out of 3 Guest Lecture reflections (worth 0.5 marks each) for a total of 1% of the course grade.** Students who attend every presentation and complete all 3 reflections will be awarded a 0.5 mark bonus on their final numerical grade.

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 is listed below along with the XPs you can earn from the activity.

The more you prepare, participate, practice, and study the more XPs you will acquire. In total there are 4 Mastery Exam units (see section on Mastery Points for details). Each Mastery Exam unit is worth 1.25 marks, for a total of 5 marks on XPs overall. Based on the number of XPs you obtain you will be assigned a grade out of 1.25, based on the following criteria **per each of the four Mastery Exam units**:

Level 1: 40% of possible XPs – Grade of 0.25 out of 1.25

Level 2: 50% of possible XPs – Grade of 0.5 out of 1.25

Level 3: 60% of possible XPs – Grade of 0.75 out of 1.25

Level 4: 70% of possible XPs – Grade of 1 out of 1.25

Level 5: 80% of possible XPs – Grade of 1.25 out of 1.25

BONUS LEVEL: 90% of possible XPs – Grade of 1.5 out of 1.25

Pre-class Questions

Description of this activity

These questions will be found on CAPA in the “First Year Chemistry Lectures – 2023 Fall” course space. You will have 5 attempts per question to get the question correct. These questions are **best completed before class**. For example, questions from January 10 will be due at 8:30am on January 10 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 getting the correct answer to each question by the “best before” date of **8:30am before class that day**

- OR -

Each pre-class homework question is worth 1 XP for getting the correct answer to each question by the “expiry” date of **11:30pm the day before the Mastery Exam where the content is covered**

Example: A student completes 2 pre-class homework questions for January 15 correctly on January 13, 1 pre-class homework question for January 15 correctly on January 21 and does not correctly answer 1 pre-class homework question for January 15 within the 5 tries. Therefore, this student will get $2 \times 2 + 1 \times 1 + 0 = 5$ XPs (out of a maximum of 8 XPs) for the January 15 pre-class questions.

In-Class Engagement Questions

Description of this activity

These questions will be provided during class time based on the pre-class videos and questions. Attending class and collaborating with your peers is a valuable experience, therefore more points are awarded to students who submit these questions during class time. Students will be able to submit their response only on the days we have class, and these questions are submitted for grading **during class time online** via MS Forms. The MS Form is open from 8am to 12 noon on class days.

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

How to gain XPs from this activity?

Each in-class engagement question is worth 3 XPs for getting the correct answer to each question **during class time on class days**.

Example: A student attempts the in-class engagement questions for January 10, submitting their response during class online through the MS form. Imagine there are 2 questions for this class, and the student gets 1 question correct, and the other incorrect. This student will get 3 XPs for January 10.

Post-Topic Checkpoints

Description of this activity

Post-Topic Checkpoints are timed assessments found on CAPA in the “First Year Chemistry Lectures – 2024 Winter” 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 1st try** – 1 out of 1 on the question
- Answer correctly on the 2nd try** – 0.9 out of 1 on the question
- Answer correctly on the 3rd try** – 0.8 out of 1 on the question
- Answer correctly on the 4th try** – 0.7 out of 1 on the question
- Answer correctly on the 5th try** – 0.6 out of 1 on the question
- Answer correctly on the 6th 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
4.5+	15
4-4.4	14
3-3.9	13
2-2.9	12
1-1.9	11
0.5-0.9	10

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

Example: A student completes the Post-Topic Checkpoint for Topic 14 on January 21 with a grade of 4.1/5. This student will receive 14 XPs since they have completed the Checkpoint before 11:30pm on January 25 (before Mastery Exam 1 occurs) given that Topic 1 is evaluated on Mastery Exam 1.

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 – 2024 Winter” 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.

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
40-49%	20
30-39%	15
20-29%	10
10-19%	5

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 January 25 since the Mastery Exam 1 occurs on January 26.

Example: A student completes the Practice Exam for Mastery Exam 3 on March 8. They get a grade of 68%. Therefore, the student will receive 30 XPs as the Practice exam was completed before the deadline of March 10 at 11:30pm (before Mastery Exam 3 occurs).

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 it is critical that students have mastered the learning objectives in CHEM1012/1022. Mastery points will be awarded based on the final overall grade for each Mastery Exam. Together, the combination of all four (4) Mastery Exam grades is worth 60% of the course overall at **15% per exam**.

Mastery Exams are graded based on skills mastery. The skills that we will be examining can be found in the Skills Inventory section at the beginning of each “Exam Bank” handout per class. Skills will be graded on a pass/fail basis, meaning part marks on questions are not awarded (i.e. the skill graded as fully mastered or not).

Mastery Exams

The details of each individual Mastery Exam are as follows:

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

Mastery Exam 1: Friday, January 26 covering Topic 13 & Topic 14*

Mastery Exam 2: Monday, February 12 covering Topics 15, 16 & 17*

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

Mastery Exam 4: Tuesday, April 9 covering Topics 21, 22, 23, 24 & 25*

*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. For Mastery exam 1, expect 1-2 questions from Chem 1011/1021 (Self-Study B1).

- Each Mastery Exam will occur during class time for students **registered in in-person sections (Sections 01, 02, 03)**
- 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 “CHEM1012 & CHEM1022 - Concepts in Chemistry II - Lecture – 2024 Winter” Brightspace Course Site. In addition, students will need to **bring their own approved non-programmable scientific calculator. Be sure to have an approved calculator as all other calculators are prohibited.** See the “Required Lecture Materials” section of this syllabus for information on approved calculators. Besides a calculator and writing utensils, no other materials are permitted in the exam. This includes, but is not limited to the course textbook, course notes, extra paper, “cheat” sheets and pocket periodic tables.

- Mastery Exams are **individual assessments**, therefore no collaboration with other students (i.e. cheating) is allowed.

Mastery Exam Storm Closure Policy

In the event that Dalhousie University closes for weather/power outages affecting a Mastery Exam, the Mastery exam will take place during the very next class. Any content missed during that class will then become self-study material as to keep the lecture schedule intact. If there is inclement weather but Dalhousie University remains open, the Mastery Exam will go ahead as scheduled.

Make-up Mastery Exams

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

Mulligan Exam

During the exam period (April 11-23, 2024) we will be offering a **“Mulligan Exam”**.

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

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

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

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

More information about the details of the Mulligan Exam will be posted to the “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2024 Winter” Brightspace Course Site near the end of the semester.

Section 3: Laboratory Component



Location:

Basement of the Chemistry Building
Room 100-108P

Winter 2024 Lab Schedule:



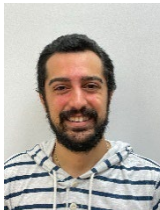

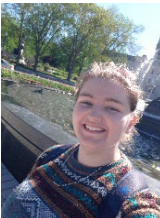
The lab schedule is posted on Brightspace and in the syllabus.

Labs Begin:

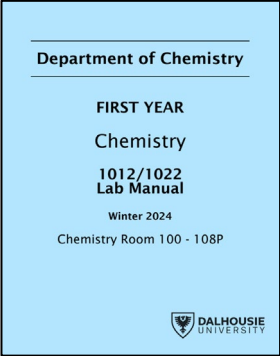



Monday, January 15, 2024

Laboratory Instructors

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

Instructor Photo	Instructor Name	Lab Sections
	Dr. Jennifer MacDonald (pronouns: she/her)	B01, B02, B03, B04, B11, B12, B13, B14 Lab Coordinator
	Dr. Joshua Bates (pronouns: he/his)	B05, B06, B15, B16, B51, B52, B55, B56
	Joe Weatherby (pronouns: he/his)	B07, B08, B53, B54
	Sarrah Putwa (pronouns: she/her)	B09, B10
	Sam Knight (pronouns: she/her)	B17, B18, B57, B58

Required Materials for Lab

Lab Material Photo	Lab Material Description
	Lab Manual Available at the Dalhousie Bookstore (~\$25.62 + tax)
	Hardcover Lab Notebook Available at the Dalhousie Bookstore (~\$8.99 + 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 (~\$29.99 + 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 “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2024 Winter” 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, January 21, 2024**.

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 “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2024 Winter” Brightspace Course Site in the content area “Laboratory Orientation and Safety”. Successful completion of the Safety Module Assignment includes reading the General Safety Statement on Brightspace and obtaining a perfect mark (i.e., 100%, 25 out of 25) on the five Safety Module Quizzes (located in CAPA on the First Year Chemistry Labs – 2024 Winter course space). Successful completion of the Lab Map Assignment includes completing the virtual laboratory tour on Brightspace, submitting your responses on CAPA, and obtaining a perfect mark (i.e. 100%, 34 out of 34). After completion of these requirements, you should feel comfortable working in a chemistry lab and have the tools you need to promote a safe lab environment.

Completion of the Safety Module and Lab Map, which is evaluated based on the submission of the CAPA Assignments, is **worth 1% of the overall final grade**. To receive a grade of 1 out of 1 on the Safety Module and Lab Map Assignment, the Safety Module and Lab Map Assessments must be submitted via CAPA by **11:30 pm local Halifax time on Sunday, January 21, 2024**.

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.

If you have completed the Safety Module and Lab Map in Fall 2023, receiving scores of 25/25 and 34/34, respectively, your grade will be transferred to your Winter 2024 course.

WHMIS Course Module

WHMIS, the Workplace Hazardous Materials Information System, is a global harmonized system used to classify and label hazards and regulate handling procedures within industry and academic fields, especially those in science and engineering. Regardless of your chosen field of study within science and engineering beyond first year, being familiar with WHMIS is a significant asset. As such, it is required that ALL students in first year chemistry enrol in and complete the Dalhousie University WHMIS Safety course provided by the Dalhousie Environmental Health and Safety Office offered through the Faculty of Open Learning and Career Development. As this course is substantial in nature, completion of the course will be worth 3% of your final grade. Instructions for how to register for the course are found on the Lab Brightspace Site under the content area “Laboratory Orientation and Safety.” Please ensure that you register and complete the WHMIS course well in advance of the deadline (**11:30 pm local Halifax time on Sunday, January 28, 2024**).

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, January 28, 2024**. **Only the Dalhousie WHMIS Safety Course Completion Certificate will be accepted for credit in Chem 1012/1022.**

Any WHMIS Course Modules completed after the due date will not be graded, 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).

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.

If you have completed Dalhousie WHMIS Training and received a grade of 3/3 in Fall 2023, your WHMIS Grade will be transferred to your Winter 2024 course.

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:

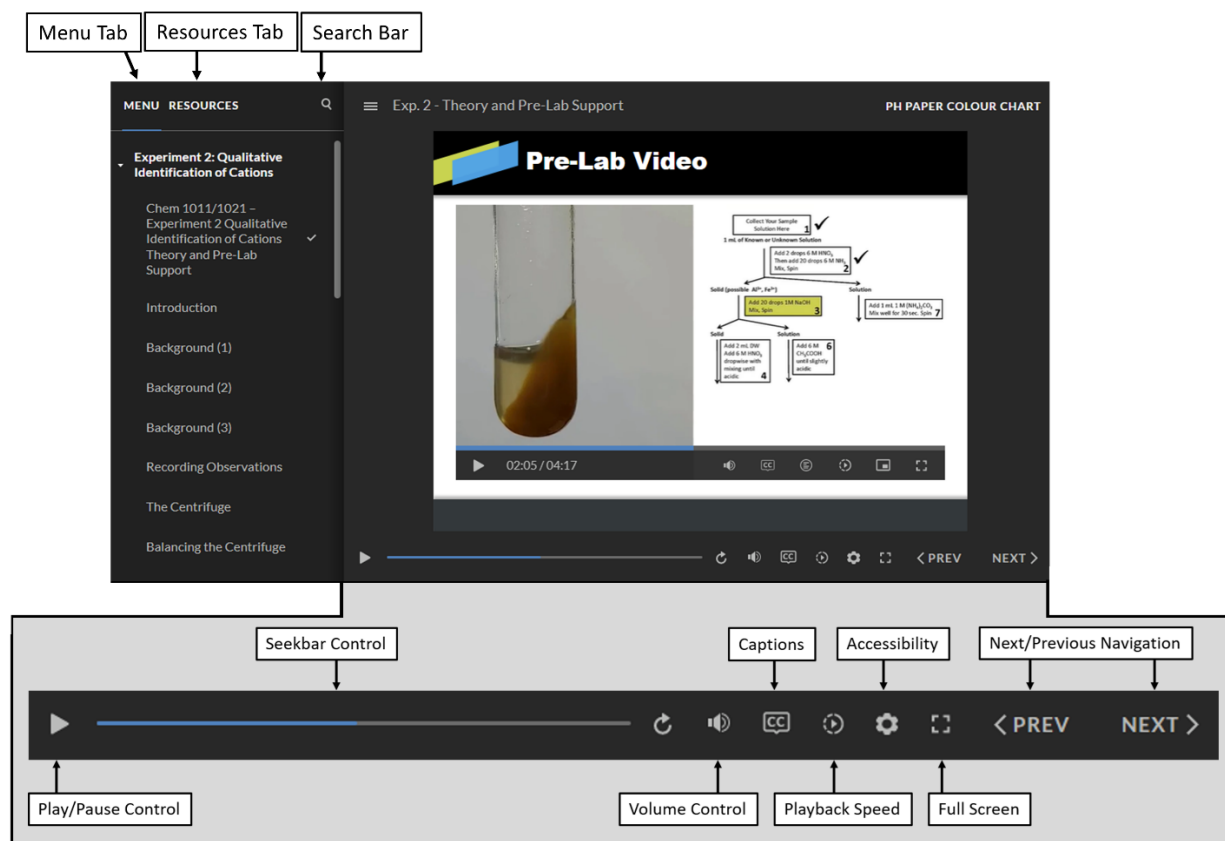
- Date
- Title of Experiment
- Data Tables and Observations from Raw Data Sheet. *If the experiment does not have a Raw Data Sheet, please use the Grade Sheet in your lab manual as a guide to prepare your lab notebook.*

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

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



During Your Experiment

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

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

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

After Your Experiment

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

Laboratory Schedule

The exact laboratory schedule will be different for each student depending on their laboratory section. Please find **your lab section** and highlight the row to find **your laboratory experiment schedule**.

Sect.	Day	Exp. 8 & 9	Exp. 10	Exp. 11	Exp. 12 & 13	Exp. 14	Exp. 15	Exp. 16
B01	Mon.	Jan. 15 1:30–3pm	Jan. 22 1:30–3pm	Jan. 29 1:30–4:30pm	Feb. 12 1:30–4:30pm	Mar. 4 1:30–3pm	Mar. 11 1:30–3pm	Mar. 25 1:30–4:30pm
B02	Mon.	Jan. 15 3–4:30pm	Jan. 22 3–4:30pm	Feb. 5 1:30–4:30pm	Feb. 26 1:30–4:30pm	Mar. 4 3–4:30pm	Mar. 11 3–4:30pm	Apr. 1 1:30–4:30pm
B03	Mon.	Jan. 15 2:30–4pm	Jan. 22 2:30–4pm	Jan. 29 2:30–5:30pm	Feb. 12 2:30–5:30pm	Mar. 4 2:30–4pm	Mar. 11 2:30–4pm	Mar. 25 2:30–5:30pm
B04	Mon.	Jan. 15 4–5:30pm	Jan. 22 4–5:30pm	Feb. 5 2:30–5:30pm	Feb. 26 2:30–5:30pm	Mar. 4 4–5:30pm	Mar. 11 4–5:30pm	Apr. 1 2:30–5:30pm
B05	Tues.	Jan. 16 8:30–10am	Jan. 23 8:30–10am	Jan. 30 8:30–11:30am	Feb. 13 8:30–11:30am	Mar. 5 8:30–10am	Mar. 12 8:30–10am	Mar. 26 8:30–11:30am
B06	Tues.	Jan. 16 10–11:30am	Jan. 23 10–11:30am	Feb. 6 8:30–11:30am	Feb. 27 8:30–11:30am	Mar. 5 10–11:30am	Mar. 12 10–11:30am	Apr. 2 8:30–11:30am
B07	Tues.	Jan. 16 2:30–4pm	Jan. 23 2:30–4pm	Jan. 30 2:30–5:30pm	Feb. 13 2:30–5:30pm	Mar. 5 2:30–4pm	Mar. 12 2:30–4pm	Mar. 26 2:30–5:30pm
B08	Tues.	Jan. 16 4–5:30pm	Jan. 23 4–5:30pm	Feb. 6 2:30–5:30pm	Feb. 27 2:30–5:30pm	Mar. 5 4–5:30pm	Mar. 12 4–5:30pm	Apr. 2 2:30–5:30pm
B09	Wed.	Jan. 17 10:30am–12pm	Jan. 24 10:30am–12pm	Jan. 31 10:30am–1:30pm	Feb. 14 10:30am–1:30pm	Mar. 6 10:30am–12pm	Mar. 13 10:30am–12pm	Mar. 27 10:30am–1:30pm
B10	Wed.	Jan. 17 12–1:30pm	Jan. 24 12–1:30pm	Feb. 7 10:30am–1:30pm	Feb. 28 10:30am–1:30pm	Mar. 6 12–1:30pm	Mar. 13 12–1:30pm	Apr. 3 10:30am–1:30pm
B11	Wed.	Jan. 17 1:30–3pm	Jan. 24 1:30–3pm	Jan. 31 1:30–4:30pm	Feb. 14 1:30–4:30pm	Mar. 6 1:30–3pm	Mar. 13 1:30–3pm	Mar. 27 1:30–4:30pm
B12	Wed.	Jan. 17 3–4:30pm	Jan. 24 3–4:30pm	Feb. 7 1:30–4:30pm	Feb. 28 1:30–4:30pm	Mar. 6 3–4:30pm	Mar. 13 3–4:30pm	Apr. 3 1:30–4:30pm
B13	Wed.	Jan. 17 2:30–4pm	Jan. 24 2:30–4pm	Jan. 31 2:30–5:30pm	Feb. 14 2:30–5:30pm	Mar. 6 2:30–4pm	Mar. 13 2:30–4pm	Mar. 27 2:30–5:30pm
B14	Wed.	Jan. 17 4–5:30pm	Jan. 24 4–5:30pm	Feb. 7 2:30–5:30pm	Feb. 28 2:30–5:30pm	Mar. 6 4–5:30pm	Mar. 13 4–5:30pm	Apr. 3 2:30–5:30pm
B15	Thurs.	Jan. 18 8:30–10am	Jan. 25 8:30–10am	Feb. 1 8:30–11:30am	Feb. 15 8:30–11:30am	Mar. 7 8:30–10am	Mar. 14 8:30–10am	Mar. 28 8:30–11:30am
B16	Thurs.	Jan. 18 10–11:30am	Jan. 25 10–11:30am	Feb. 8 8:30–11:30am	Feb. 29 8:30–11:30am	Mar. 7 10–11:30am	Mar. 14 10–11:30am	Apr. 4 8:30–11:30am
B17	Thurs.	Jan. 18 2:30–4pm	Jan. 25 2:30–4pm	Feb. 1 2:30–5:30pm	Feb. 15 2:30–5:30pm	Mar. 7 2:30–4pm	Mar. 14 2:30–4pm	Mar. 28 2:30–5:30pm
B18	Thurs.	Jan. 18 4–5:30pm	Jan. 25 4–5:30pm	Feb. 8 2:30–5:30pm	Feb. 29 2:30–5:30pm	Mar. 7 4–5:30pm	Mar. 14 4–5:30pm	Apr. 4 2:30–5:30pm
B51	Tues.	Jan. 16 10–11:30am	Jan. 23 10–11:30am	Jan. 30 10am–1pm	Feb. 13 10am–1pm	Mar. 5 10–11:30am	Mar. 12 10–11:30am	Mar. 26 10am–1pm
B52	Tues.	Jan. 16 11:30am–1pm	Jan. 23 11:30am–1pm	Feb. 6 10am–1pm	Feb. 27 10am–1pm	Mar. 5 11:30am–1pm	Mar. 12 11:30am–1pm	Apr. 2 10am–1pm
B53	Tues.	Jan. 16 1–2:30pm	Jan. 23 1–2:30pm	Jan. 30 1–4pm	Feb. 13 1–4pm	Mar. 5 1–2:30pm	Mar. 12 1–2:30pm	Mar. 26 1–4pm
B54	Tues.	Jan. 16 2:30–4pm	Jan. 23 2:30–4pm	Feb. 6 1–4pm	Feb. 27 1–4pm	Mar. 5 2:30–4pm	Mar. 12 2:30–4pm	Apr. 2 1–4pm
B55	Thurs.	Jan. 18 10–11:30am	Jan. 25 10–11:30am	Feb. 1 10am–1pm	Feb. 15 10am–1pm	Mar. 7 10–11:30am	Mar. 14 10–11:30am	Mar. 28 10am–1pm
B56	Thurs.	Jan. 18 11:30am–1pm	Jan. 25 11:30am–1pm	Feb. 8 10am–1pm	Feb. 29 10am–1pm	Mar. 7 11:30am–1pm	Mar. 14 11:30am–1pm	Apr. 4 10am–1pm
B57	Thurs.	Jan. 18 1–2:30pm	Jan. 25 1–2:30pm	Feb. 1 1–4pm	Feb. 15 1–4pm	Mar. 7 1–2:30pm	Mar. 14 1–2:30pm	Mar. 28 1–4pm
B58	Thurs.	Jan. 18 2:30–4pm	Jan. 25 2:30–4pm	Feb. 8 1–4pm	Feb. 29 1–4pm	Mar. 7 2:30–4pm	Mar. 14 2:30–4pm	Apr. 4 1–4pm

Pre-Lab CAPA Assignments

All pre-lab Assignments will be hosted on the online learning platform, CAPA in the First Year Chemistry Labs – 2024 Winter course space, which can be accessed by going to <https://capa.chemistry.dal.ca>. Please refer to the instructions in the syllabus when logging into CAPA for the first time.

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 Jan 15, 2024 at 1:30 PM, their pre-lab would be due on Jan. 15, 2024 at 1:25 PM. **If for any reason you have made alternate arrangements for your lab session, your pre-lab deadline will remain the same, 5 minutes before your regularly scheduled lab.** No deadline extensions will be given on CAPA Pre-Lab Assignments as these assessments are open and available to students for more than 3 days.

Preparedness

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

Participation: Data Collection and Raw Data Submission

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

Post-Lab Due Dates

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

Sect.	Exp. 8 & 9	Exp. 10	Exp. 11	Exp. 12 & 13	Exp. 14	Exp. 15	Exp. 16
B01	Jan. 22, 1:30pm	Jan. 29, 1:30pm	Feb. 12, 1:30pm	Mar. 4, 1:30pm	Mar. 11, 1:30pm	Mar. 25, 1:30pm	Mar. 25, 4:30pm
B02	Jan. 22, 3:00pm	Feb. 5, 1:30pm	Feb. 26, 1:30pm	Mar. 4, 3:00pm	Mar. 11, 3:00pm	Apr. 1, 1:30pm	Apr. 1, 4:30pm
B03	Jan. 22, 2:30pm	Jan. 29, 2:30pm	Feb. 12, 2:30pm	Mar. 4, 2:30pm	Mar. 11, 2:30pm	Mar. 25, 2:30pm	Mar. 25, 5:30pm
B04	Jan. 22, 4:00pm	Feb. 5, 2:30pm	Feb. 26, 2:30pm	Mar. 4, 4:00pm	Mar. 11, 4:00pm	Apr. 1, 2:30pm	Apr. 1, 5:30pm
B05	Jan. 23, 8:30am	Jan. 30, 8:30am	Feb. 13, 8:30am	Mar. 5, 8:30am	Mar. 12, 8:30am	Mar. 26, 8:30am	Mar. 26, 11:30am
B06	Jan. 23, 10:00am	Feb. 6, 8:30am	Feb. 27, 8:30am	Mar. 5, 10:00am	Mar. 12, 10:00am	Apr. 2, 8:30am	Apr. 2, 11:30am
B07	Jan. 23, 2:30pm	Jan. 30, 2:30pm	Feb. 13, 2:30pm	Mar. 5, 2:30pm	Mar. 12, 2:30pm	Mar. 26, 2:30pm	Mar. 26, 5:30pm
B08	Jan. 23, 4:00pm	Feb. 6, 2:30pm	Feb. 27, 2:30pm	Mar. 5, 4:00pm	Mar. 12, 4:00pm	Apr. 2, 2:30pm	Apr. 2, 5:30pm
B09	Jan. 24, 10:30am	Jan. 31, 10:30am	Feb. 14, 10:30am	Mar. 6, 10:30am	Mar. 13, 10:30am	Mar. 27, 10:30am	Mar. 27, 1:30pm
B10	Jan. 24, 12:00pm	Feb. 7, 10:30am	Feb. 28, 10:30am	Mar. 6, 12:00pm	Mar. 13, 12:00pm	Apr. 3, 10:30am	Apr. 3, 1:30pm
B11	Jan. 24, 1:30pm	Jan. 31, 1:30pm	Feb. 14, 1:30pm	Mar. 6, 1:30pm	Mar. 13, 1:30pm	Mar. 27, 1:30pm	Mar. 27, 4:30pm
B12	Jan. 24, 3:00pm	Feb. 7, 1:30pm	Feb. 28, 1:30pm	Mar. 6, 3:00pm	Mar. 13, 3:00pm	Apr. 3, 1:30pm	Apr. 3, 4:30pm
B13	Jan. 24, 2:30pm	Jan. 31, 2:30pm	Feb. 14, 2:30pm	Mar. 6, 2:30pm	Mar. 13, 2:30pm	Mar. 27, 2:30pm	Mar. 27, 5:30pm
B14	Jan. 24, 4:00pm	Feb. 7, 2:30pm	Feb. 28, 2:30pm	Mar. 6, 4:00pm	Mar. 13, 4:00pm	Apr. 3, 2:30pm	Apr. 3, 5:30pm
B15	Jan. 25, 8:30am	Feb. 1, 8:30am	Feb. 15, 8:30am	Mar. 7, 8:30am	Mar. 14, 8:30am	Mar. 28, 8:30am	Mar. 28, 11:30am
B16	Jan. 25, 10:00am	Feb. 8, 8:30am	Feb. 29, 8:30am	Mar. 7, 10:00am	Mar. 14, 10:00am	Apr. 4, 8:30am	Apr. 4, 11:30am
B17	Jan. 25, 2:30pm	Feb. 1, 2:30pm	Feb. 15, 2:30pm	Mar. 7, 2:30pm	Mar. 14, 2:30pm	Mar. 28, 2:30pm	Mar. 28, 5:30pm
B18	Jan. 25, 4:00pm	Feb. 8, 2:30pm	Feb. 29, 2:30pm	Mar. 7, 4:00pm	Mar. 14, 4:00pm	Apr. 4, 2:30pm	Apr. 4, 5:30pm
B51	Jan. 23, 10:00am	Jan. 30, 10:00am	Feb. 13, 10:00am	Mar. 5, 10:00am	Mar. 12, 10:00am	Mar. 26, 10:00am	Mar. 26, 1:00pm
B52	Jan. 23, 11:30am	Feb. 6, 10:00am	Feb. 27, 10:00am	Mar. 5, 11:30am	Mar. 12, 11:30am	Apr. 2, 10:00am	Apr. 2, 1:00pm
B53	Jan. 23, 1:00pm	Jan. 30, 1:00pm	Feb. 13, 1:00pm	Mar. 5, 1:00pm	Mar. 12, 1:00pm	Mar. 26, 1:00pm	Mar. 26, 4:00pm
B54	Jan. 23, 2:30pm	Feb. 6, 1:00pm	Feb. 27, 1:00pm	Mar. 5, 2:30pm	Mar. 12, 2:30pm	Apr. 2, 1:00pm	Apr. 2, 4:00pm
B55	Jan. 25, 10:00am	Feb. 1, 10:00am	Feb. 15, 10:00am	Mar. 7, 10:00am	Mar. 14, 10:00am	Mar. 28, 10:00am	Mar. 28, 1:00pm
B56	Jan. 25, 11:30am	Feb. 8, 10:00am	Feb. 29, 10:00am	Mar. 7, 11:30am	Mar. 14, 11:30am	Apr. 4, 10:00am	Apr. 4, 1:00pm
B57	Jan. 25, 1:00pm	Feb. 1, 1:00pm	Feb. 15, 1:00pm	Mar. 7, 1:00pm	Mar. 14, 1:00pm	Mar. 28, 1:00pm	Mar. 28, 4:00pm
B58	Jan. 25, 2:30pm	Feb. 8, 1:00pm	Feb. 29, 1:00pm	Mar. 7, 2:30pm	Mar. 14, 2:30pm	Apr. 4, 1:00pm	Apr. 4, 4:00pm

Post-Lab Report Weighting Scheme

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

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

Time Management

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

Missed Labs and Make-up Experiments

Please note that due to our high course enrollment, you are only guaranteed that your timetabled lab session will be available to you for your experiments as outlined in the syllabus.

If you miss a lab, **you must email your lab instructor (chemlab@dal.ca) within 24 hours** of the missed lab to schedule a make-up experiment. Failure to do so may result in a grade of 0 for the missed lab. Make-up experiments are scheduled based on available seats in the laboratory, as a result, make-up lab session availability cannot be guaranteed.

Your email must include:

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

This process filters your message to the correct instructor automatically (based on section in the subject line) which allows us to help you faster! The lab instructor will then email you a letter of permission to do a make-up experiment at an agreed-upon time and assign a due date for your post-lab report. When you arrive to your make-up experiment you must check-in with the instructor to be assigned a temporary locker space.

A few notes about make-up experiments:

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

Final Dates for Make-up Experiments and Late Work Submissions

Exp.	Last Opportunity for Make-up Lab (Group A)	Last Opportunity for Make-up Lab (Group B)	Late Work Submission Deadline (ALL Groups)
8 & 9	Thurs, Jan. 25	Thurs, Jan. 25	Mon., Jan. 29, before 1:30pm
10	Thurs, Feb. 1	Thurs, Feb. 1	Mon., Feb. 12, before 1:30pm
11	Thurs, Feb. 8	Thurs, Feb. 15	Mon., Mar. 4, before 1:30pm
12 & 13	Thurs, Feb. 29	Thurs, Mar. 7	Mon., Mar. 11, before 1:30pm
14	Thurs, Mar. 14	Thurs, Mar. 14	Mon., Mar. 25, before 1:30pm
15	Thurs, Mar. 28	Thurs, Mar. 28	Mon., Apr. 8, before 1:30pm
16	Thurs, Apr. 4	Thurs, Apr. 4	<i>In-lab submission only</i>

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

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

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

Laboratory Exemptions

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

Lab grades for lab exemption carry forward if the student repeats the course within a 24-month period of the original start date. For example, if a student enrolls in Chem 1012/1022 in Winter 2024 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 2024, Winter 2025, and Summer 2025. 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** and **First Year Chemistry Resource Centre** are staffed by faculty and senior TA members of the First Year Chemistry Lecture and Lab team who are available to answer lecture and lab content questions, CAPA assignment questions and Post-Lab Report questions.

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

The Full Concept Room and Chemistry Resource Centre schedule will be posted on the “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2024 Winter” and “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2024 Winter” Brightspace course sites in the “Concept Room & Resource Centre” content area.

The Resource Center and *Concept Room* **open on Monday, January 9, 2024.**

The Resource Center and *Concept Room* **are closed on Friday, February 2, 2024.**

The Resource Center and *Concept Room* **are closed during Study Break February 19-23, 2024.**

The Resource Center and *Concept Room* **are closed on Friday, March 29, 2024.**

The Resource Center and *Concept Room* **close on Friday, April 5, 2024 at 4:30 pm.**

Section 5: Course Content & Learning Objectives

Course Description

Credit Hours: 3

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

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

PRE-REQUISITE: CHEM 1011.03, CHEM 1021.03 or equivalent

COORDINATORS: A. Crane, J. MacDonald

FORMAT: Lecture | Lab

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

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

CHEM 1011.03/1012.03 or CHEM 1021.03/1022.03

Course Objectives and Goals

Our primary objective for First Year Chemistry is to offer you a comprehensive and relevant course on the fundamental concepts in chemistry. Our focus is on using problem solving techniques which are applicable and transferrable to all fields of science and engineering and are not limited to just the chemistry lens used in this course. We aim to help students build good independent study

habits, time management skills, group collaborations and foster critical thinking in the sciences. By exemplifying the role of chemistry in our daily lives and in an interdisciplinary way, we hope that our students gain an appreciation for chemistry, regardless of their end academic goals.

Course Learning Outcomes

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

Course Content*Topic 13: Ideal Gas Behaviour*

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

Topic 14: Chemical Equilibria

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

Topic 15: First Law of Thermodynamics

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

Topic 16: Hess's Law

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

Topic 17: Defining the Second Law of Thermodynamics: Entropy

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

Topic 18: Gibbs Energy

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

Topic 19: Reduction-Oxidation (RedOx) Reactions

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

Topic 20: Electrochemistry

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

Topic 21: Alkanes, Cycloalkanes and Functional Groups

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

Topic 22: Spectroscopy

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

Topic 23: Introduction to Chemical Reactions

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

Topic 24: Rates of Chemical Reactions

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

Topic 25: Reaction Mechanisms

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

Laboratory Experiments

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

Section 6: University Policies and Statements

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

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

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

Accessibility

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

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

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

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

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

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

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

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

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

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

University Grading Practices

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

Section 7: University-wide Student Resources and Support

Advising

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

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

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

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

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

Academic supports

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

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

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

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

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

Other supports and services

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

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

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

Safety

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

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

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

Scent-Free Program

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

Dalhousie COVID-19 information and updates

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