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

Welcome to Chemistry 1012/1022! As this course has a high enrollment (over 1000 students per term!) and is taught by several instructors and a team of teaching assistants, 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. Just as our course enrollment is quite large and diverse, so is our syllabus; therefore, 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 (TOC)

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. Joshua Bates
(pronouns: he/him)
First Year Chemistry Course Coordinator

Email: chemlect@dal.ca

In addition to the course coordinators, there will be an assortment of other instructors, professors, and teaching assistants (TAs) available for students to meet with/work with remotely in the ***Virtual Concept Room and Resource Centre***. More information about this can be found in Section 4. Please note, that chemistry content related questions should be directed to the Virtual Concept Room and Resource Centre, not to the coordinators 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 via a discussion board as there is more consistent monitoring of this platform. However, don't worry, the course coordinators will be holding Concept Room sessions so you can ask them for help there!

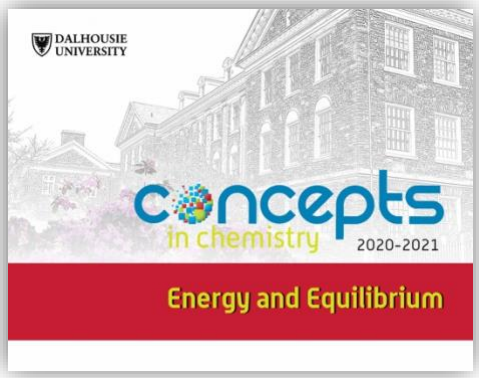
Required Materials

Course eBook

Concepts in Chemistry: Energy and Equilibrium (2020−21 Ed.)

Available at the Dalhousie Bookstore

This is a custom textbook and is updated each year to reflect changes in the curriculum. This is especially true this Winter as we continue in an online/remote learning environment. The purchasing instructions for the ebook (housed on the Willo online platform) will be posted in the “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter” Brightspace Course Site.



Non-programmable Scientific Calculator

Any non-programmable scientific calculator will suffice. However, these 2 calculators are **strongly recommended** in Chem 1012/1022, as other classes use these as required calculators in upper year courses.

It is recommended that students registered in engineering and physics have the **CASIO fx-991ES PLUS C.** It is recommended that all other science students have a **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:

CASIO fx-991ES PLUS C

SHARP EL-510RTB

Important Academic Dates

Friday, January 1, 2021
New Year's Day: University Closed

Wednesday, January 6, 2021
First day of classes

Friday, January 15, 2021
Last day to add/drop winter term courses

Friday, January 29, 2021
Last day to drop winter term courses without a W

Friday, February 5, 2021
Munro Day: University Closed

Monday, February 15, 2021 to Friday, February 19, 2021
Winter Study Break: No classes, University open

Monday, February 15, 2021
Nova Scotia Heritage Day: University Closed

Friday, April 2, 2021
Good Friday: University Closed

Wednesday, April 7, 2021 and Thursday, April 8, 2021
Last days of classes: Follows the Friday class schedule

Thursday, April 8, 2021
Last day to drop winter term courses with a W

Saturday, April 10, 2021 to Friday, April 23, 2021
Exam Period: Do not book travel until after your exam schedule has been released and confirmed

Chemistry 1012-1022 Grading Scheme

To calculate a final numerical grade for Chemistry 1012-1022 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.

Course Wide Components:

Academic Integrity Module	2%

Lecture Components:

Syllabus Module	1%
Weekly Quizzes	30%
Unit Homework	5%
Unit Exams	40%

Lab Components:

Lab Orientation Module	1%
Lab Map & Safety Module	1%
Pre-Lab Assignments	3%
Post-Lab Reports	15%
Time Management & Preparedness	2%

Total:	100%

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

- Obtain at least a grade of 37.5/75 on the lecture component of the course. *(Syllabus Module Excluded)*
- Obtain at least a grade of 10/20 on the laboratory component of the course. *(Lab Orientation Module and Lab Map & Safety Module Excluded)*
- 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 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

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 honestly. 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 complete the Academic Integrity Module, which is prepared by the Dalhousie Writing Centre, and delivered through Brightspace.

All students who enrol in Chem 1012/1022 will automatically also be added to the "First Year Chemistry- Writing Centre Academic Integrity Module" Brightspace Course Site. Completion of the Academic Integrity Module is worth 2% of your grade overall. A completed module requires students to get 100% on the "Academic Integrity Quiz and Agreement Statement" at the end of the module. Students will have unlimited attempts to get a grade of 100% on this quiz. **To receive the 2% completion grade, the Academic Integrity Module must be completed before 11:59 am Halifax local time on Tuesday, January 26, 2021.** For those who successfully completed the module for grades in the Fall 2020 semester (see Brightspace grades section to confirm if successful completion was recorded), the grade will be transferred over and the module will not need to be completed again.

Finally, please note that you will likely see two (2) versions of the Academic Integrity Module in Brightspace. ***As you are registered in Chem 1012/1022 only complete the one that says "First***

***Year Chemistry" in the title**. These two modules are identical, however for grading purposes only the "First Year Chemistry" version is being graded. The other version is for students who are not enrolled in Chem 1012/1022.*

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.*

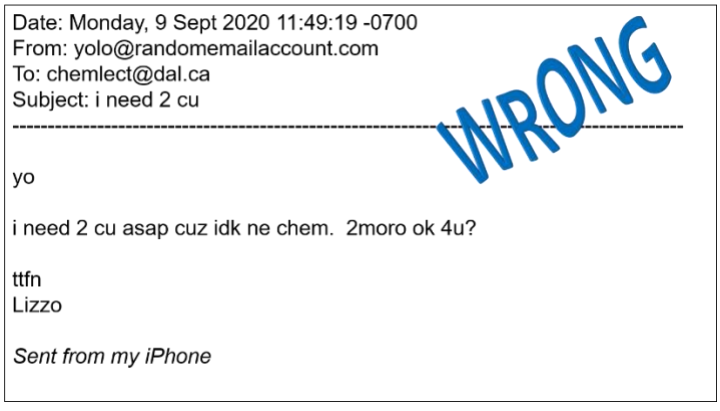
- Use an **informative subject line**. Many instructors/professors get hundreds of emails a day. This keeps an email from getting lost or forgotten.

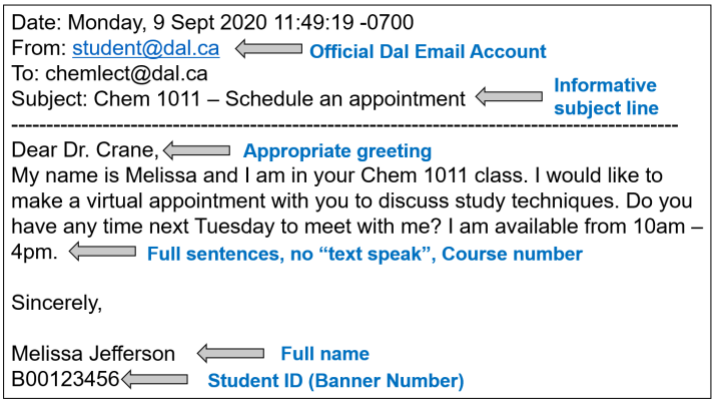
- Use an **appropriate greeting**. Most faculty will let you know if they want to be addressed more formally (*example: Dr. Bates*) or more informally (*example: Josh*). If you are unsure, typically you would assume a formal greeting at first to maintain professionalism.

- 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!*





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 make our way through the current 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 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.

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. Who would have thought at this time last year this is what we'd be facing today?! Let's work together to make this the best class/semester possible, while recognizing that things may change as the situation evolves.
  Thank-you to Dr. Michelle Brock (@MikkiBrock), Associate Prof at Washington & Lee University, for sharing these objectives for use by other educators via Twitter

Section 2: Lecture Content

Syllabus Module
The Syllabus Module is a short assignment designed to help you become familiar with the Course Syllabus and policies. The Syllabus Module itself will focus on Sections 1 and 2 of the Course Syllabus. All of the Laboratory Content information from Section 3 of the Course Syllabus will be included in the "Lab Orientation Module".

The Syllabus Module is found in the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" Brightspace Course Site in the content area "Welcome! Course Syllabus and Schedule" along with a downloadable PDF copy of the Course Syllabus. The Syllabus Module contains short videos to walk students through this Course Syllabus document, therefore, the Syllabus Module should be watched with a copy of the Course Syllabus on hand.

Completion of the Syllabus Module requires students to achieve a grade of 100% on the "Syllabus Module Assessment" **and** submit the "Syllabus Module Assessment Completion Certificate" for grading through the Microsoft Form provided. Completion of the assessment, as well as uploading and submitting the completion certificate, is **worth 1% of the overall final grade**. To receive the 1% completion grade, the "Syllabus Module Assessment Completion Certificate" must be submitted via Microsoft Form must before **11:59 am local Halifax time on Sunday, January 24, 2021.**

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

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

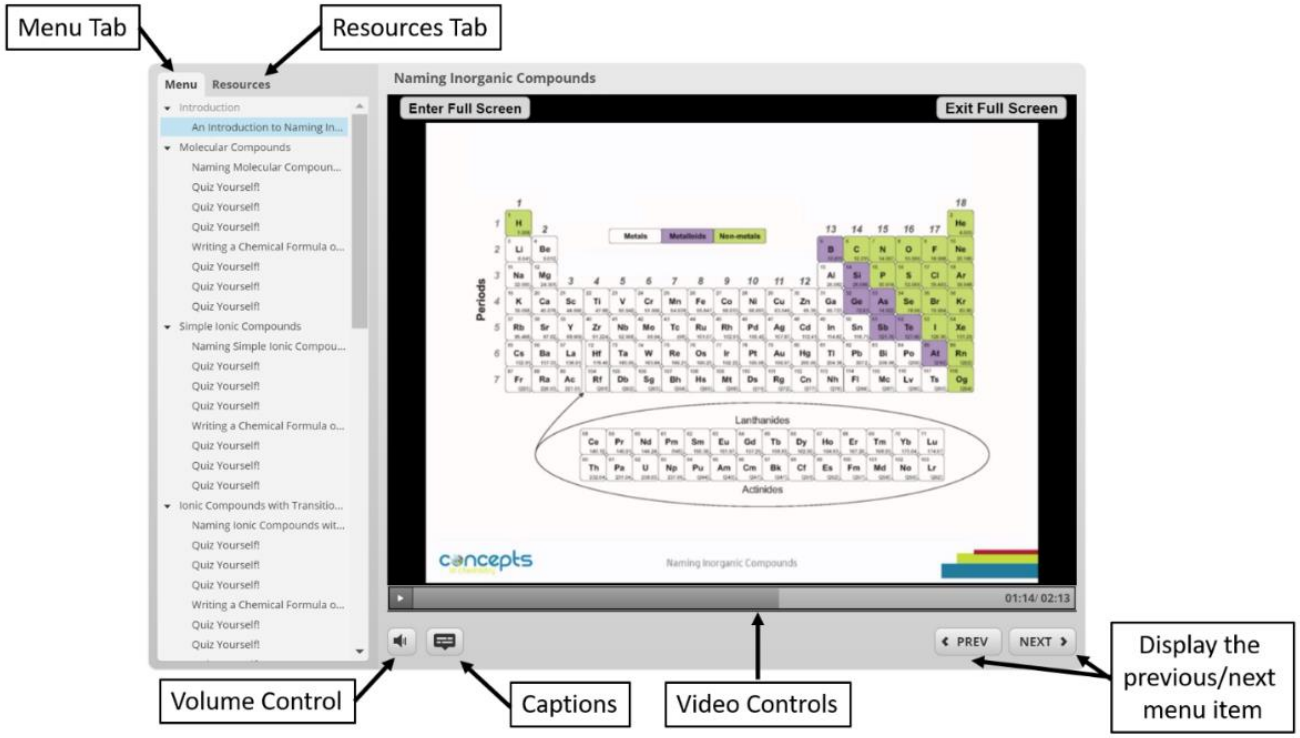
Lecture Modules

Lecture Modules can be found in the “CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter” Brightspace Course Site in the “Week” folders. Lecture Modules are organized based on the week you should be covering specific material.

All course lectures have been pre-recorded and embedded into interactive lecture modules for asynchronous delivery. Each module will begin with several short lecture videos and worked examples (under 10 minutes each), followed by interactive “Quiz Yourself” questions for you to try on your own. “Quiz Yourself” questions also have the fully worked video solutions to guide students through the problem, that can be watched if there is any confusion. Students will be able to navigate the lecture modules videos and interactive “Quiz Yourself” questions through the menu on the left-hand side. The ability to pause, skip ahead, or go backwards using the controls and search bar at the bottom of each video allows for easy navigation and note taking.

Each lecture module has been designed with accessibility in mind, therefore a blank set of “skeleton” notes has been provided for each lecture module. These can be downloaded for printing/taking notes on. All videos contain audio where the volume can be controlled using the speaker button at the bottom of the module. As a result, each video has also been close-captioned, which can be turned on by clicking the speech balloon button at the bottom of the module.

An image of a lecture module can be found below, pointing out the menu, resources tab, volume control, captioning, video controls, and previous/next navigation controls.



Weekly Synchronous Workshops

In order to provide students with the option for a live and interactive experience, **every Thursday starting at 1:05 pm**, there will be a problem-solving session for that week's lecture content. Students will be provided the problems in advance of the session. Attendance/participation in the session is optional. Each session will be recorded, and the length of the session will vary based on the number and type of problems (but will not exceed 3 hours). Within 24 hours after each session the full answer key to the handout and recording will be posted on Brightspace.

Each session will be carried out as a ***Microsoft Teams Live Event*** in webinar style, where students will not share audio/video, but instead ask questions via a chat board monitored by the instructor and a teaching assistant (TA). The links to each workshop are found in the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" Brightspace Course Site in the "Week" folders.

Weekly Quizzes

In order to help students keep on track and on top of the lecture material, there will be weekly "concept check" quizzes which can be found in the CAPA "First Year Chemistry Lecture – 2021 Winter" course space. Each quiz will consist of 5 questions based on the lecture module(s) for the week. Also, each quiz will be delivered in the "escape room" game style, where correctly answering a question unlocks/opens then next question until the quiz is complete. The details of each quiz are as follows:

- Quizzes will open at 8 am local Halifax time every Friday, and close 24 hours later (8 am local Halifax time every Saturday). Note that when Friday is a holiday and the University is closed (denoted by * *), the quiz will instead begin at 8 am local Halifax time on the preceding Thursday and close 24 hours later (8 am local Halifax time on Friday). The exact dates and content of each quiz is listed below:

Quiz 1: **January 15, 2021** covering Topics 13 & 14
Quiz 2: **January 22, 2021** covering Topic 15
Quiz 3: **January 29, 2021** covering Topic 16
*** Quiz 4:** **February 4, 2021** covering Topic 17 *
Quiz 5: **February 12, 2021** covering Topic 18
Quiz 6: **February 26, 2021** covering Topics 19
Quiz 7: **March 5, 2021** covering Topic 20
Quiz 8: **March 12, 2021** covering Topic 21
Quiz 9: **March 19, 2021** covering Topic 22
Quiz 10: **March 26, 2021** covering Topic 23
*** Quiz 11:** **April 1, 2021** covering Topic 24 *
*** Quiz 12:** **April 8, 2021** covering Topic 25 *

- During the 24 hours that the quiz is open, students can choose to do the quiz at any time that fits their schedule; however, once a quiz is started a 2-hour timer will be activated during which time the quiz must be completed. If all questions are answered correctly on the first try, it should take 30-45 minutes for a quiz to be completed. ***Note that regardless of the start time, the quiz will close at 8 am local Halifax time the Saturday (or Friday for Thursday quizzes) following the quiz start date.***

- In order to get the best learning experience from a quiz, students should try to do the quiz with ***only a non-programmable calculator and the provided "Data, Equations and Periodic Table" file*** linked at the top of each quiz (and found in the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" Brightspace Course Site in the content area "CAPA Resources"). However, the use of course notes, the course Brightspace sites and the course textbook are allowed. The use of any other external source of information (such as other books and webpages) is prohibited and would be considered academic misconduct.

- Weekly quizzes are **individual assessments**; therefore, collaboration of any sort is prohibited and would be considered academic misconduct. This includes, but is not limited to, discussing the quiz with your friends/peers/classmates, TAs/instructors, siblings/family members, and on discussion boards.

- Only the best 10 out of 12 quizzes will be counted towards your final grade. Each counting quiz is worth 3%, adding up to 30% total for all the quizzes in the semester.

- Students will be allowed 3 attempts at each quiz. Note that each attempt will be different, and the highest grade achieved over the 3 attempts will be counted towards your final grade.

- Each question will have 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.

- There are no make−up quizzes or extra time given as there are multiple attempts at each quiz and two (2) quizzes are already being dropped.

- "Student Declaration of Absence" forms cannot be applied to a quiz, as two (2) quizzes are already being dropped.

Unit Homework

We define each "unit" in this course as a set of topics that will be evaluated together. In order to help students prepare for assessments, such as weekly quizzes or unit exams, additional Unit Homework questions can be found in the CAPA "First Year Chemistry Lecture – 2021 Winter" course space. Each Unit Homework folder will consist of a varying number of questions based on the lecture module(s) for the unit. The details of each Unit Homework folder are as follows:

- Unit Homework Folders will open *at least* 1 week before the Lecture Modules that are being covered by that unit.

- Students can choose to work on the Unit Homework at their own pace up until the due date. Unit Homework is always due at 11:59 am the day before the Unit Exam covering that content. The exact due dates and content of each Unit Homework Folder is listed below:

  January 26, 2021 covering Topics 13, 14, & 15
  February 23, 2021 covering Topics 16, 17, & 18
  March 23, 2021 covering Topics 19, 20, & 21
  Date to be announced* covering Topics 22, 23, 24 & 25

  * Scheduled by the Registrar's Office for a date between April 10-23, 2021. Watch for a Brightspace Announcement confirming the exact date once scheduled.

- All four Unit Homework Folders are counted towards your final grade. Each Unit Homework Folder is worth 1.25%, adding up to 5% total for all the Unit Homework in the semester.

- Students have 99 tries per homework question. There is no penalty for using more than 1 try.

- To get full marks on a given Unit Homework Folder, students must correctly complete a minimum of 50% of the total sub-questions in the folder. For example, if there were 25 questions with 5 sub-questions each in a folder, then the student would need to complete a minimum of 63 sub-questions to get the full 1.25% on that folder (as 62.5 rounds up to 63 out of 125). You can check your Unit Homework Folder progress by using the "Grades section" on CAPA.

- Homework folder questions can be completed collaboratively. This means you may work on these questions with your friends/peers/classmates or get help with them from TAs/instructors

in virtual meetings and on discussion boards. These are a learning tool, and one of the best ways to learn is through discussion.

- You may use any resource you wish to help you complete the homework folder questions.

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

Unit Exams

We will be having four (4) unit exams for students to demonstrate the learning objectives of the course in the context of topics which have been covered per unit. The details of each Unit Exam folder are as follows:

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

  Unit Exam 1: January 27, 2021 covering Topics 13, 14, & 15
  Unit Exam 2: February 24, 2021 covering Topics 16, 17, & 18
  Unit Exam 3: March 24, 2021 covering Topics 19, 20, & 21
  Unit Exam 4: Date to be announced* covering Topics 22, 23, 24 & 25

  * Scheduled by the Registrar's Office for a date between April 10-23, 2021. Watch for a Brightspace Announcement confirming the exact date once scheduled.

- Each Unit Exam is timed to take students 1 to 1.5 hours to complete, however once the exam is started a 3-hour timer will be activated during which time the exam must be complete.

- Students will be assigned a time block during the day of the exam during which they will have to complete the exam. This time block will be posted in the Grades Section of Brightspace. If the time block you are assigned does not work for you due to time zone issues or other class scheduling conflicts, please fill out the form (https://tinyurl.com/DalChemWinterExamSlotSwitch) before the dates listed below and we will assign a more suitable time block during the exam day.

  January 20, 2021 for Unit Exam #1 time block switches
  February 17, 2021 for Unit Exam #2 time block switches
  March 17, 2021 for Unit Exam #3 time block switches
  April 1, 2021 for Unit Exam #4 time block switches

- The intention of each Unit Exam is for students to demonstrate the skills they have been developing over the weeks leading up to the exam, as such, students should do the exam with ***only a non-programmable calculator and the provided "Data, Equations and Periodic***

Table" file linked at the top of each exam (and found in the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" Brightspace Course Site in the content area "CAPA Resources"). However, the use of course notes, the course Brightspace sites and the course textbook are allowed. The use of any other external source of information (such as other books and webpages) is prohibited and would be considered academic misconduct.

- Unit Exams are **individual assessments**; therefore, collaboration of any sort is prohibited and would be considered academic misconduct. This includes, but is not limited to, discussing the quiz with your friends/peers/classmates, TAs/instructors, siblings/family members, and on discussion boards.

- The format of the exam will be mainly automatically graded CAPA questions like you would have seen in Unit Homework folders or on Weekly Quizzes. However, in addition there may be several hand-graded questions of student explanations or drawings, which will be submitted via Microsoft Forms. In all cases, please carefully follow the instructions of each question when answering.

- Unit exams will be presented to students one question at a time. Once a student has submitted their answer to a question, it is equivalent to "passing in your work", so only one (1) try per question is given. Submitting an answer to a question prompts the current question to disappear and the next question to be displayed. Revisiting a question (i.e., going backwards) is not possible once an answer is submitted.

- Partial marks are not awarded on automatically graded questions through CAPA. Partial marks *may* be awarded in *some* hand-graded questions submitted through Microsoft Forms. This style of grading is like our testing model during the in-person delivery of the course.

- Together, the combination of all four (4) Unit Exam grades is worth 40% of the course overall. Each Unit Exam will have a weighting based on student performance on each exam such that:

  The lowest exam grade will count for **5% of the final grade**
  The highest exam grade will count for **15% of the final grade**
  The middle exam grades will count for **10% of the final grade each**

  Therefore, imagine a student had a 90%, 70%, 65% and 80% on the Unit Exams. The 90% grade would be worth 15% overall (0.90 x 15 marks = 13.5 marks). The 65% grade would be worth 5% overall (0.65 x 5 marks = 3.25 marks). The remaining exams, at 70% and 80% would be worth 10% overall each (0.70 x 10 marks = 7 marks and 0.80 x 10 marks = 8 marks). Therefore, this student would get 31.75 out of 40 on the Unit Exam component overall (Since, 13.5 + 3.25 + 7 + 8 = 31.75).

- ***If you miss a Unit Exam for any reason you can apply for a make-up exam***, so long as you did not open, and thus activate the timer of, the original exam on the original exam date. The make-up exam will happen on the Tuesday following the original exam date. To register for the make-up unit exam, please fill out the form (https://tinyurl.com/DalChemWinterMissedExam) by the end of the Sunday following the original exam date. You will then receive detailed information about the make-up exam on the Monday before it happens on Tuesday. ***Note****: the timeline may be slightly different for Unit Exam #4 depending on the date it gets scheduled for. Please check Brightspace for the most up-to-date information after Unit Exam #4 is scheduled.*

- ***If you miss a Unit Exam entirely, for any reason,*** you will be granted an exemption on that unit exam. **Only one exemption can be granted per student**. To register for an exam exemption, please fill out the form (https://tinyurl.com/DalChemWinterMissedExam) within the 7 days after the original exam date and indicate that you are unable to write a make-up exam. This will shift the grading scheme of the remaining three (3) Unit Exams as follows:

  The lowest exam grade will count for **8% of the final grade**
  The highest exam grade will count for **18% of the final grade**
  The middle exam grade will count for **14% of the final grade**

  If any additional Unit Exams are missed entirely, a grade of 0 will be assigned.

Section 3: Laboratory Content

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 with writing lab reports, in particular, purpose/conclusions and recording thorough observations. The Laboratory Orientation Module will focus on Section 3 of the Course Syllabus and will be accessible from **Jan. 6 - Jan. 24, 2021.** All of the Lecture Content information from the Course Syllabus will be included in the "Syllabus Module".

The Laboratory Orientation Module is found in the "CHEM1012 & CHEM1022 – Concepts in Chemistry I – Lab – 2021 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 via Microsoft Forms must be submitted by **11:59 am local Halifax time on Monday, January 25, 2021.**

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

Although we will be working in a virtual laboratory environment this term, 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 will complete a Chemistry Safety Module and Lab Map. The Safety Module and Lab Map Modules will be accessible from **Jan. 6 - Jan. 24, 2021.** Successful completion of the Safety Module Assignment includes reading the General Safety Statement on Brightspace, 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−2021 Winter site). 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 at the end, 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 via CAPA must be submitted by **11:59 am local Halifax time on Monday, January 25, 2021.**

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 Assessements and “Student Declaration of Absence” forms cannot be applied to the Safety Module and Lab Map Assessements, 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 2020, your grade will be transferred to your Chem 1012/1022 course.

Laboratory Format, Expectations and Policies

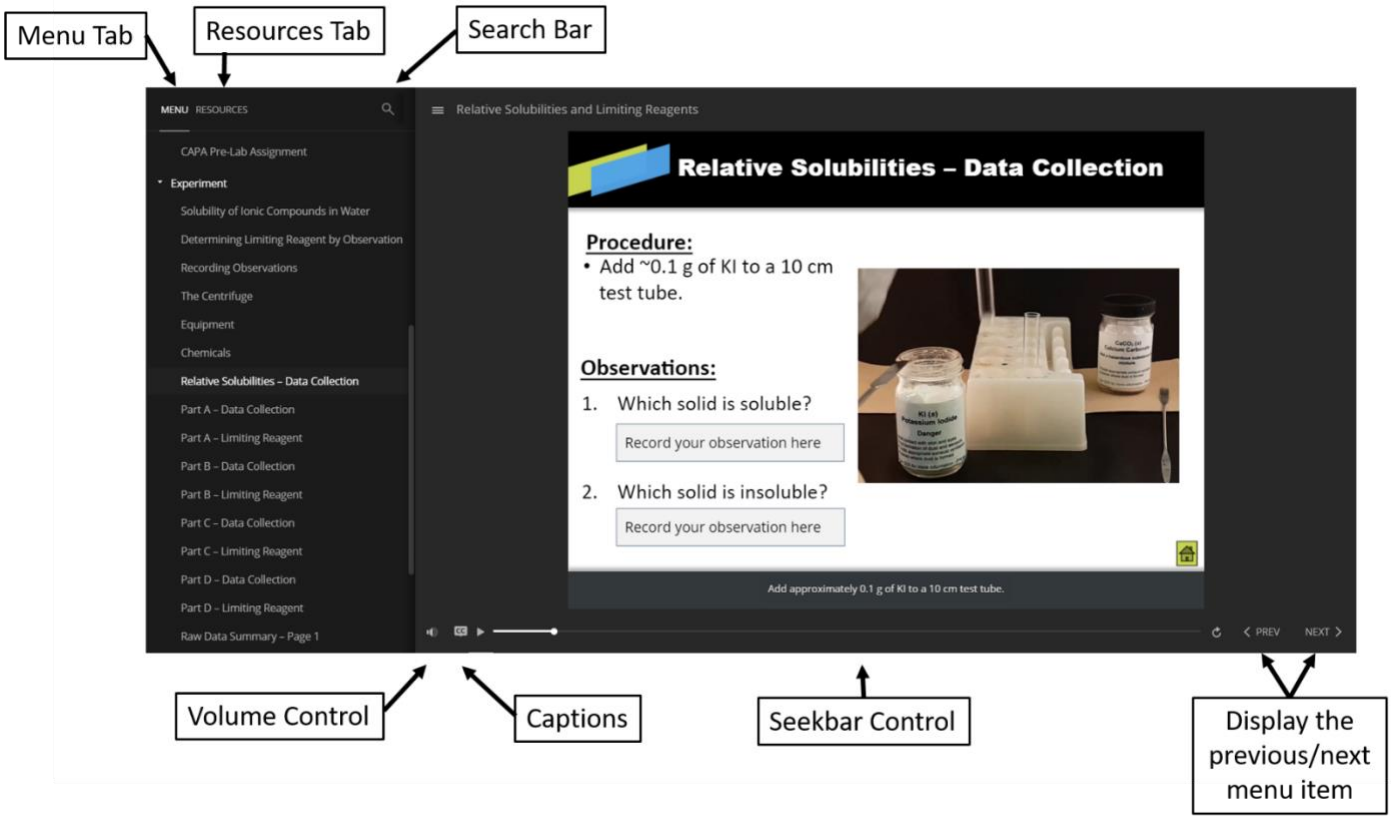
This term, we will complete nine asynchronous, interactive virtual lab modules that enable you to make real-time observations, with an added emphasis on experimental theory, observation and data interpretation - skills transferable to all science and engineering fields. The lab modules are custom built, media rich (recorded where possible in student point-of-view format), interactive (practice questions and data collection), and accessible, with consideration given to clarity in colour schemes, fonts and slide design as well as fully closed-captioned with downloadable audio transcripts.

Each experiment consists of a virtual laboratory module (delivered through Brightspace), a Pre-Lab assignment (delivered through CAPA), and a post-lab assignment (submitted through Microsoft Forms).

Virtual Lab Module Structure

The lab module player features a menu, resources tab, 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 files (printable raw data, grade sheets, data tables, audio transcripts, and links to Pre-Lab and post-lab submissions).

An image of a virtual lab 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.



Suggested Pathway Through A Lab Module

Each lab module contains:

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

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

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

Laboratory Experiment Schedule

Each Laboratory Experiment Module will be available for completion according to the following schedule:

Experiment 8:	Jan. 11 – Jan. 17, 2021
Experiment 9:	Jan. 18 – Jan. 24, 2021
Experiment 10:	Feb. 1 – Feb. 7, 2021
Experiment 11:	Feb. 8 – Feb. 14, 2021
Experiment 12:	Mar. 1 – Mar. 7, 2021
Experiment 13:	Mar. 8 – Mar. 14, 2021
Experiment 14:	Mar. 15 – Mar. 21, 2021
Experiment 15:	Mar. 22 – Mar. 28, 2021
Experiment 16:	Mar. 29 – Apr. 4, 2021

Pre-Lab CAPA Assignments

All Pre-Lab CAPA Assignments will be hosted on the online learning platform, CAPA, which can be accessed by going to https://capa.chemistry.dal.ca. Please refer to the instructions on page 11 of the syllabus when logging into CAPA for the first time.

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

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 Virtual Concept Room and Resource Centre 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 virtual lab 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. CAPA Pre−Labs are due as scheduled on page 24. 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 3%.**

The exact due dates and content of each Pre-Lab is listed below.

All Pre-Lab CAPA Assignments must be submitted through CAPA by **11:59 am local Halifax time** on the schedule noted below to be considered marked for credit:

Experiment 8:	Jan. 11, 2021 at 11:59 am
Experiment 9:	Jan. 18, 2021 at 11:59 am
Experiment 10:	Feb. 1, 2021 at 11:59 am
Experiment 11:	Feb. 8, 2021 at 11:59 am
Experiment 12:	Mar. 1, 2021 at 11:59 am
Experiment 13:	Mar. 8, 2021 at 11:59 am
Experiment 14:	Mar. 15, 2021 at 11:59 am
Experiment 15:	Mar. 22, 2021 at 11:59 am
Experiment 16:	Mar. 29, 2021 at 11:59 am

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 a 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. To be considered prepared for your virtual experiment, you must complete the Pre-Lab CAPA Assignment before the deadline (as outlined above). Student preparedness is **worth 1% of the overall lab grade**. A student who is unprepared 2 or more times during term will not be awarded this grade.

Post-Lab Reports

Post-Lab Reports will be submitted through Microsoft Forms. You will be able to access the Post-Lab Report link from within the virtual lab module and also from within Brightspace. When completing your Post-Lab Report, please keep the following points in mind.

1. Ensure that you have completed your work and maintained a physical copy of your work before entering your answers into the form to minimize the chance of error in your submission. If you would like a downloadable copy of the grade sheet to use as a worksheet when you are preparing for your submission through Microsoft Forms, you can find one within the experiment module in the resources tab.
2. The form automatically records your name, email, and student ID.
3. If you would like to receive a receipt of your submission with a copy of your responses, you can check the box at the end of the form to opt-in to receive this receipt.

4. Please ensure that you begin filling out the form well in advance of the posted deadline. Your submissions are only recorded once the SUBMIT button at the end of the form is clicked. If you do not click submit before the deadline, then your report will be marked “late” or not accepted if the last date to submit work has passed for the experiment.
5. Post-Lab Assignments are **individual assessments**. Students may seek support through the Virtual Concept Room and Resource Centre from TAs/Instructors, the laboratory coordinator, and classmates. However, all Post-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).
6. If you have difficulties submitting your Grade Sheets through Microsoft Forms, please contact Dr. Jennifer L. MacDonald at chemlab@dal.ca.

Post-Lab Report Due Dates

All Post-Lab Reports must be submitted through Microsoft Forms by **11:59 am local Halifax time** on the schedule noted below to be considered “on-time” submissions.

Experiment 8:	Jan. 18, 2021 at 11:59 am
Experiment 9:	Feb. 1, 2021 at 11:59 am
Experiment 10:	Feb. 8, 2021 at 11:59 am
Experiment 11:	Mar. 1, 2021 at 11:59 am
Experiment 12:	Mar. 8, 2021 at 11:59 am
Experiment 13:	Mar. 15, 2021 at 11:59 am
Experiment 14:	Mar. 22, 2021 at 11:59 am
Experiment 15:	Mar. 29, 2021 at 11:59 am
Experiment 16:	Apr. 5, 2021 at 11:59 am

Post-Lab Report Weighting Scheme

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

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

Time Management

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 (outlined above) 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. Further information about Final Dates for Experiments and Late Work Submissions can be found on page 26 of the syllabus.

Final Dates for Experiments and Late Work Submissions

All experiments will be available for students to complete after the Post-Lab Due Dates and until the Late Work Submission Deadlines. Reports that are received in this time-frame will be marked as late and may have impact on your time management score. All Late Post-Lab Reports must be submitted through Microsoft Forms by **11:59 am local Halifax time** on the schedule noted below to be marked for credit:

Experiment 8:	Feb. 1, 2021 at 11:59 am
Experiment 9:	Feb. 8, 2021 at 11:59 am
Experiment 10:	Mar. 1, 2021 at 11:59 am
Experiment 11:	Mar. 8, 2021 at 11:59 am
Experiment 12:	Mar. 15, 2021 at 11:59 am
Experiment 13:	Mar. 22, 2021 at 11:59 am
Experiment 14:	Mar. 29, 2021 at 11:59 am
Experiment 15:	Apr. 5, 2021 at 11:59 am
Experiment 16:	Apr. 8, 2021 at 11:59 am

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% (13/20) 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 enrols in Chem 1012/1022 in Winter 2021 and completes the course with a grade of F, has 45% on the lecture component, **and** a lab score greater than 67% (13/20) the student would qualify for lab exemption in the following terms: Summer 2021, Winter 2022, and Summer 2022. 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) in order to apply for a lab exemption.

Section 4: Virtual Concept Room & Chemistry Resource Centre

The ***Virtual Concept Room*** is a way of booking a 10-minute appointment with an instructor, professor or senior teaching assistant for live and interactive help with the course material, homework questions and labs. These appointments will be made through the Microsoft Bookings app linked in the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" and "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2021 Winter" Brightspace course sites and will be Microsoft Teams meetings that get scheduled directly in your Dalhousie University Microsoft Outlook calendar. Students have free access to Bookings, Teams and Outlook through Dalhousie University as part of the Microsoft 365 suite of programs and apps. Detailed instructions on how to book an appointment and the detailed schedule for the Virtual Concept Room will be posted on the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" and "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2021 Winter" Brightspace course sites in the "Virtual Concept Room" content area.

The ***Virtual Chemistry Resource Centre*** is a series of discussion boards where students can post questions and get help with the course material, homework questions and labs. These discussion boards will be monitored from 9 am to 7 pm (local Halifax time) from Monday to Friday. Therefore, posting to the discussion boards is the fastest way to receive help with your course material. Discussion boards will be found in both the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" and "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lab – 2021 Winter" Brightspace course sites under "Virtual Chemistry Resource Centre".

In addition, the First Year Chemistry Team will be attempting to create community among its students by helping them make connections and create ***study groups*** while also facilitating the booking of ***study sessions*** through Microsoft Teams using Microsoft Bookings. These would be unmonitored sessions that students will be able book and to use in order to meet people in the class and discuss course materials. More information on these study groups/sessions will be posted on the "CHEM1012 & CHEM1022 – Concepts in Chemistry II – Lecture – 2021 Winter" Brightspace Course Site in the "Study Groups" content area.

Remember when meeting with faculty/each other and when posting to discussion boards, students must always adhere to the Dalhousie University Student Code of Conduct (https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/student-life-policies/code-of-student-conduct.html) which means all interactions must be made with respect, integrity and professionalism towards your fellow classmates and the First Year Teaching Team, therefore fostering an inclusive learning environment.

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: J. Bates, 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

Self-Study B1: Foundations in Chemistry

Significant Figures
Multiple Measurements: Averages and Standard Deviations
Logarithms/Mathematics and Chemistry
Solving Problems Using Dimensional Analysis
Naming of Inorganic Compounds
Molecular Mass and Formula Mass
The Mole and Molar Mass
Writing Chemical Reactions
Stoichiometry and Limiting Reagents
Lewis Structures and Molecular Shape
Chromatography
Acid and Base Review

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^{o}_{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
S_N2 Substitution Reactions
Addition Reactions of Lithium Reagents
Diels-Alder Reactions
Predict products and draw curly arrow mechanisms for S_N2, 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

Virtual Laboratory Experiments

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

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

Missed or Late Academic Requirements due to Student Absence

As per Senate decision instructors may not require medical notes of students who must miss an academic requirement**, including the final exam**, for courses offered during fall or winter 2020-21 (until April 30, 2021).

Information on regular policy, including the use of the Student Declaration of Absence can be found here: https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html.

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