



COURSE OUTLINE

1. **Course:** CHEM 209, General Chemistry For Engineers - Winter 2022

Lecture 01 : F 09:00 - 09:50 in ENG 03

Instructor	Email	Phone	Office	Hours
Dr. Roxanne Jackson	rjjackso@ucalgary.ca	403 220-8797	SA 258	Please see D2L

Lecture 02 : M 08:00 - 08:50 in ENG 224

Instructor	Email	Phone	Office	Hours
Dr. Roxanne Jackson	rjjackso@ucalgary.ca	403 220-8797	SA 258	Please see D2L

Lecture 03 : M 13:00 - 13:50 in ENG 03

Instructor	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	--	SA 144F	By appointment: http://ow.ly/zSz450HeFMw

Lecture 04 : R 13:00 - 13:50 in ENG 224

Instructor	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	--	SA 144F	By appointment: http://ow.ly/zSz450HeFMw

Lecture 05 : F 13:00 - 13:50 in ENE 123 and 13:00 - 13:50 in ENE 127

Instructor	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	--	SA 144F	By appointment: http://ow.ly/zSz450HeFMw

Lecture 06 :

Instructor	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	--	SA 144F	By appointment: http://ow.ly/zSz450HeFMw

Coordinator(s)

Name	Email	Phone	Office	Hours
Dr. Roxanne Jackson	rjjackso@ucalgary.ca	403 220-8797	SA 258	Please see D2L

To account for any necessary transition to remote learning in the winter 2022 semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

Lectures and tutorials will be combined into **weekly 2h in-person workshops**. During each workshop, students will be working in groups to review and apply the content of the asynchronous material available on D2L.

Workshops will be assessed via individual and/or group quizzes. Group assessments will always be completed during scheduled class time. Individual assessments may include in-class or out-of-class components such as a post-workshop assignment; details will be posted to D2L at least one week prior to the workshop. Refer to Section 3 below and the course D2L site for more details about the grading of these assessments.

Labs will be offered in-person on a biweekly basis. Labs will start the week of January 17th. Post-lab assignments will be submitted online within 72h of completing the in-person lab activity. Consult your student center for the complete schedule.

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#). **Online Delivery Details:**

This course is being offered online in real-time via scheduled meeting times, you are required to be online at the

same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

Every week, asynchronous material (pre-recorded videos, reading assignments and/or practice questions) will be made available on D2L. Students are responsible for completing the work before attending their weekly scheduled workshop. Refer to the checklists on the course D2L site for details.

Midterm Exam

This timed, SYNCHRONOUS assessment will be available on D2L at 9 AM MST on February 15, 2022. The assessment is designed to take you 60 minutes of writing time with 30 minutes of buffer time. It must be completed and submitted by 10:30 AM MST on February 15, 2022.

If you experience an issue that affects your ability to complete the online assessments, which can include (but is not limited to) issues with technology, time zone issues, caregiving responsibilities, or distractions within your test-taking environment, you will need to contact your instructor as soon as possible.

For any synchronous assessment, time will be adjusted for SAS students if needed. As well, accommodations for students facing a significant barrier to writing the assessment during the scheduled time will be done on a case-by-case basis, *e.g. different time zones, caregiving responsibilities, ability to secure an appropriate test-taking environment*. Students who need accommodation for the midterm or final exam must contact the coordinator **at least 10 business days in advance of the scheduled assessment**.

Course Site:

D2L: CHEM 209 -(Winter 2022)-General Chemistry For Engineers

Note: Students must use their U of C account for all course correspondence.

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Chemistry EDI Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Associate Head EDI, Belinda Heyne (bjmheyne@ucalgary.ca)

2. Requisites:

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Chemistry 30 (or Continuing Education - Chemistry 2) and one of Mathematics 30-1 or Mathematics 2 (offered by Continuing Education) and admission to the Schulich School of Engineering.

Antirequisite(s):

Credit for Chemistry 209 and any of 201, 203, 211, 213 and 301 will not be allowed.

3. Grading:

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Laboratories (5) ¹	25%	Ongoing		
Workshops (6 of 8) ²	27%	Ongoing		
Top Hat ³	3%	Ongoing		
Midterm Exam ⁴	15%	Feb 15 2022 at 09:00 am (1.5 Hours)	online	Online
Wrap-up Assignment (1)	5%	Apr 12 2022		
Registrar Scheduled Final Exam	25%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

¹ Biweekly. See D2L for details.

² 4 group assessments and 4 individual assessments. One absence from each type of assessment will be excused automatically. If an absence is not used, the lowest grade will be dropped instead.

³ TopHat will be used both in-class and as assigned homework. However, this grade will be determined from the homework (out of class) portion only.

⁴ This timed, SYNCHRONOUS assessment will be available on D2L at 9 AM MST on February 15, 2022. The assessment is designed to take you 60 minutes of writing time with 30 minutes of buffer time. It must be completed and submitted by 10:30 AM MST on February 15, 2022.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	92.0 %	86.0 %	82.0 %	78.0%	74.0%	70.0 %	66.0 %	62.0%	58.0%	54.0 %	50.0 %

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

In order to meet the pre-requisite conditions (i.e. a grade of C- or higher), a student must meet **ALL** of the following requirements:

1. Attend AND submit reports for a minimum of three (3) of the five (5) laboratory exercises
and
2. Achieve a minimum 50% overall grade in the laboratory component
and
3. Achieve a minimum 50% weighted average in the Workshops component
and
4. Achieve a minimum 50% weighted average on the examinations (midterm and final) **or** achieve a minimum 50% grade on the final exam.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

Midterm Exam

There is no deferred midterm exam. If you are unable to write your midterm exam during the scheduled exam time, notify the Engineering Student Center (engg.assessment@ucalgary.ca) either **10 business days in advance** for scheduled absences (such as medical appointments or religious observance) or course conflicts, or **within 48h of the missed exam** for emergency absences (such as illness). The weight of the missed exam will be shifted to the final exam.

Laboratories

For **laboratory experiments** that will be or have been missed, **use the form linked on the course D2L** to notify the Coordinator of your absence (do not email) either **10 business days in advance** for scheduled absences (such as medical appointments or religious observance), or within 48h of the missed experiment for emergency absences. Make-up labs cannot be offered to accommodate out-of-class activities (such as exams) in another course. Please contact the course with the out-of-class activity for accommodation in this case.

Availability of make-up laboratory sessions is limited and access is not guaranteed. If timing allows, and at the discretion of the Coordinator, a make-up session or adjusted report due date may be offered. If these options are not possible, the weight of the missed experiment may be distributed over other lab components (at the coordinator's discretion). Lab reports may not be submitted without attending the corresponding in-person laboratory session, except by special written permission of the lab coordinator.

Workshops

One absence from an individual workshop assessment and one absence from a group assessment (for any reason) will be excused automatically when calculating grades at the end of term. If you are experiencing an extenuating circumstance (such as an extended illness) that will cause you to miss more than two graded workshops, reach out to the Engineering Student Center (engg.assessment@ucalgary.ca) to discuss your situation as early as possible. Any requests for accommodation will be handled on an individual basis, however make-up or deferred Workshop activities will not always be possible.

5. Scheduled Out-of-Class Activities:

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm Exam	Online (D2L)	Tuesday, February 15, 2022 at 9:00 am	1 Hours

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

The online midterm assessment will be available on D2L at 9 AM MST on February 15, 2022. The assessment is designed to take you 60 minutes of writing time with 30 minutes of buffer time. It must be completed and submitted by 10:30 AM MST on February 15, 2022.

6. Course Materials:

The **online textbook** can be found here (free of charge):
<https://wpsites.ucalgary.ca/chem-textbook/table-of-contents-chem-209/>

Top Hat will be used for online practice problems as well as during the workshops to gather student feedback. Participation is optional but highly recommended. Access to Top Hat is free for University of Calgary students. More details will be provided on the D2L course website.

Other REQUIRED materials (available from the bookstore):

- lab coat (full/knee length) & safety glasses
- non-programmable scientific calculator (such as Casio FX 260 or equivalent)

Specific software requirements for this course:

To complete the workshops and lab activities, you will need access to:

- Office 365 suite: (Available to all UofC students at no additional cost)
 - Excel - full version: not iOS, Android, or web version- or equivalent software - for laboratory activities.
 - Word - or equivalent word processor for completing laboratory activities.
- PDF viewer (e.g. Acrobat Reader, Nitro Reader). Preview (on Mac) or in-browser reader is not sufficient.
- A scanner or phone app that can save documents/photos as PDF (e.g. OneDrive app).

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

7. Examination Policy:

All sections will write the same examinations. The questions are based on input from all course instructors. All exams are to be completed individually by the student submitting the exam.

The **online midterm exam** is "open-notes". Reference to your course notes, textbook (electronic or paper edition), and authorized online resources only will be allowed - use of all other websites, online or offline resources during these exams is prohibited. A detailed list of allowed resources will be posted to the course D2L at least one week prior to the exam.

Online exams include additional "buffer time" to allow for time to scan and submit required documents and to accommodate minor technological issues. All documents and quizzes must be uploaded, saved, and submitted **before the end of the posted exam time**. Any quiz attempts still in-progress at the end of the exam time will be manually submitted with whatever answers have been saved at that time. In the event of a major technological issue that lasts longer than the allotted exam buffer time and prevents timely completion of the exam, contact the course coordinator (rjjackso@ucalgary.ca) as soon as possible.

For any synchronous assessment, time will be adjusted for SAS students if needed:

- Students who need accommodation for the midterm or final exam must contact the course coordinator **at least 10 business days before** the scheduled assessment.
- For exams requiring a length accommodation, the extra time will be calculated from the base time of the exam. For example, the midterm is a 60 min exam with 30 min "buffer", for a total of 90 min. A student with a 25% time accommodation would receive $60 + (60 \times 25\%) + 30 = 105$ min as their adjusted length. This time will generally be added to the **start** of the exam time - i.e. starting the exam before the rest of the class - unless this results in a conflict with the student's registered class or exam schedule.

As well, accommodations for students facing a significant barrier to writing the assessment during the scheduled time will be done on a case-by-case basis, e.g. different time zones, caregiving responsibilities, ability to secure an appropriate test-taking environment. If any student expects to have difficulty completing a synchronous activity during its scheduled timeslot, please contact the course coordinator, Dr. Roxanne Jackson (rjjackso@ucalgary.ca) as soon as possible - for ongoing or scheduled conflicts, at least **within 10 business days before** the exam.

All **in-person exams** (including tutorial quizzes and final exam) are **closed-book**. A Data Sheet will be provided with the exam, and a **non-programmable** scientific calculator is permitted. No other aids may be used.

Other course activities may allow additional resources to be used or collaboration in groups. Please read the instructions for each assignment carefully to determine what resources and degree of communication is allowed.

Students should also read the Calendar, [Section G](#), on Examinations.

8. Approved Mandatory And Optional Course Supplemental Fees:

Laboratory Breakage Fees and Locker Check-out:

The Department of Chemistry has a laboratory glassware breakage fee. At the start of the course, each student is assigned a locker and checks-in to establish that they have a complete set of usable glassware. By signing for check-in, a student agrees that they are now responsible for the glassware until check out. Any equipment that is missing, unusable or has been replaced during the semester will be charged to the student. All students, even those who withdraw early from the course must check out of the laboratory before the last day of lectures (April 12, 2022). Any student who fails to check out before the last day of lectures for the term will be assessed a charge of \$30.00. If this fee is not paid by the posted deadline, university services (registration, transcripts, etc.) may be withheld.

9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

10. Human Studies Statement:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Services:** For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (syva@ucalgary.ca) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>)
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)
Student Academic Misconduct [Policy](#) and [Procedure](#)
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. Academic Accommodation Policy:

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Dr. Yuen-Ying Carpenter by email

yyscarpe@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: ombuds@ucalgary.ca.
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

Laboratory component

In addition to the workshop component of the course, students are scheduled for five laboratory experiments (see the course syllabus or D2L website for a detailed schedule). **You must attend only the laboratory section in which you are registered**, unless you have been given written permission by the coordinator to attend a different section.

It is mandatory that students wear a lab coat and safety glasses at all times when working in the lab, as well as wearing appropriate clothing. Anyone not following these or other safety protocols will not be permitted to enter the lab or conduct experiments. Instructions and safety regulations are in the lab manual and laboratory safety training materials (see below). The lab manual can be found on the course D2L site and includes details on how to prepare for the labs and how each lab will be assessed.

Students who previously completed labs in-person and are repeating the course within the last three years can be exempted from the Laboratory Component of the course if a grade of 75% or higher was obtained on the lab portion. Students choosing to exempt from the lab should be aware that:

- The labs in the 2021-2022 academic year may be significantly different from prior labs in this course;
- The material covered in these labs will be integrated into other course assessments; and,
- The lab grade achieved on the previous attempt will be carried forward.

Prior to applying for an exemption, students are encouraged to connect with their course instructor or coordinator to better understand the risks and benefits in their specific course, as well as what access they will (or will not) have to lab materials or feedback as an exempt student.

Students applying for a lab exemption should contact the Undergraduate Science Center (science.advising@ucalgary.ca) no later than Monday January 17 to apply. Students registering in the course after this date should contact the USC as soon as possible if they wish to apply for an exemption.

Note: Online labs completed in the Fall 2020-Winter 2021 academic year are not eligible for use as a lab exemption in the in-person Winter 2022 term.

Laboratory Safety Course

All undergraduate students taking chemistry laboratories are required to complete an introductory course (approx. 50 minutes) on laboratory safety. This course is presented in an online format. The Safety Course must be completed before the first laboratory experiment. Students who do not complete the safety lessons will subsequently be denied admission to the laboratories. While it will not count directly to the final grade, the

material is considered to be part of the course and is therefore appropriate for inclusion into laboratory prelabs and exams. Students who have previously completed the Chemistry Safety Course at the University of Calgary in the past five years are NOT required to repeat it.

Course Outcomes:

- Identify factors that affect reaction rate, depict reaction rate with symbols, and explain rates at the molecular level
- Identify factors that affect reaction extent, depict reaction extent with symbols, and explain extent at the molecular level
- Recognize how different reactions behave for key examples of acids & bases, solubility, electrochemistry
- Connect atomic and chemical properties with the electronic structure of atoms, molecules, and ions and between these species
- Develop an appreciation for why these aspects of chemistry are important to engineers
- Apply good laboratory practice

Electronically Approved - Jan 17 2022 18:23

Department Approval

Electronically Approved - Jan 19 2022 11:30

Associate Dean's Approval