UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Chemistry
Science B 605
403 220-5385
chem.info@ucalgary.ca

COURSE OUTLINE

1. **Course:** CHEM 203, General Chemistry: Change and Equilibriumm - Fall 2021

   Lecture 01: MWF 09:00 - 09:50 - Online

Instructor	Email	Phone	Office	Hours
Dr Todd Sutherland	todd.sutherland@ucalgary.ca		ZOOM (ONLINE)	See D2L

   Lecture 02: TR 08:00 - 09:15 - Online

Instructor	Email	Phone	Office	Hours
Dr Yuen-ying Carpenter	yyscarpe@ucalgary.ca (email preferred)		ZOOM	See D2L

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.

This course has a registrar scheduled, synchronous final exam. The writing time is 2 hours + 50% buffer time.

COURSE COMPONENTS

*For clarity: *synchronous* components are *live* whereas *asynchronous* components would be viewed *on-demand*.

Lectures
Synchronous online Zoom lectures will focus on the application of the course concepts. You are expected to attend your assigned lecture section to keep up with course content.

The lectures will be complemented by recommended pre-reading, posted handouts, videos and/or lecture notes. Occasionally, instructors may make a specific lecture date optional - as an open question and answer period following a structured pre-reading or video activity.

Note: While recordings of 'live' Zoom lectures will generally be available via D2L, participating during the 'live' lecture offers significant advantages, including discussion with peers, opportunities for questions, and feedback on your understanding during activities. Please note that there may be a delay of a few days between the date of the lecture and the availability of the recording.

Labs & Tutorials (alternate bi-weekly in the same timeslot)
You are also scheduled for weekly 75-minute *synchronous TA-facilitated sessions.* **You must attend your assigned time slot,** *unless you have been given permission by the lab coordinator.*

Online lab/tutorial meetings begin the week of **September 13th, 2021.** There are no scheduled lab/tutorial meetings during the week of September 27 or during the last week of classes (Dec 6).

The content of this weekly meeting alternates between lab (focused on analysis of experimental data) and tutorial (focused on theory and practice). Each week gives you a chance meet and work with other students, collaborating in small groups on problems. Facilitators from the teaching team guide each session's activities and offer support. In laboratory weeks, you will submit a ***laboratory assignment*** for graded feedback after your session. In tutorial weeks, you will check your understanding and receive individual feedback on the tutorial material as part of your ***weekly check-in assignments***.

- While your schedule in your Student Center shows a 3-hour block every week, the 'live' Zoom session will only last 75-minutes each week. We suggest taking a break after the live (facilitated) session and then using the remaining unfacilitated time to finish any practice or assignments from the session while the material is

fresh in your mind. This practice also ensures that you also discover any additional questions for your TA while there is still time for them to reply to your questions before any upcoming graded assessments.

More details on the activities each week will be provided on D2L, including login details for the synchronous Zoom meetings. These sessions are *not* recorded in order to encourage open discussion and participation.*See Section 4 for details on what to do if you need to miss a scheduled meeting.*

Course Site:

D2L: CHEM 203 - Fall 2021 -General Chemistry: Change and Equilibrium (https://d2l.ucalgary.ca)

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

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).

Antirequisite(s):
Credit for Chemistry 203 and any of 209, 213 or 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:

Component(s)	Weight %	Dates
Weekly check-in assignments	15%	See D2L
Laboratory Activities (4 Experiments)	24%	See D2L
Term test 1 (*synchronous*)*	10%	Wednesday October 6 from 6:30 - 9 p.m.
Term test 2 (*synchronous**)	15%	Wednesday November 3 from 6:30 - 9 p.m.
Wrap-up assignment	8%	Due Thursday December 9 at noon
Final exam (*synchronous**)	28%	(TBD - *scheduled by the Registrar*)

*See Section 7 for additional details on your synchronous examinations.

More detail on your asynchronous assessments

Weekly check-in assignments (5 counted of 8 available assignments)

- These short D2L assignments will be submitted at the start of each week that check your understanding of the material covered in the previous week. **In weeks following each of the 5 scheduled tutorial meetings, the check-in questions will closely resemble the activities from the live tutorial session**. Otherwise, check-ins will focus on the previous week's lecture material. Attending lectures and tutorials is the best way to prepare for these assignments.
- These check-ins will help you build routines in your studying so that you stay on track with material throughout the semester, and so that you can reach out for support or clarification before a bigger assessment like a term test.
- No check-ins are scheduled for the week of either the term test. A detailed schedule of check-in assignment due dates is posted to D2L.
- Although a total of 8 check-in assignments will be offered throughout the term,**only the top 5 submitted check-ins will be counted towards your final grade**. If you need to skip a week for*any* reason, don't worry; you can catch up on the check-in as ungraded practice later.

Laboratory activities (4 multi-part activities)

- Each of the 4 online laboratory experiments will involve three parts: preparing before the lab, attending a synchronous meeting, and submitting a short 'report' or assignment asynchronously afterwards. Details on each of these components and their evaluation will be posted to D2L.

Wrap-up assignment (1 activity)

- Instead of a weekly check-in during the last week of class, you will submit Wrap-up Assignment which helps you reflect on and make connections between all of the material before the final exam.

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	95.0 %	87.0 %	82.0 %	77.0%	72.0%	66.0 %	62.0 %	58.0%	54.0%	50.0 %	45.0 %

This course will have a final exam that will be scheduled by the Registrar. 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.

The final exam will be administered using an on-line platform. Per section G.5 of the online Academic Calendar, timed final exams administered using an on-line platform, such as D2L, will be available on the platform. Due to the scheduling of the final exams, the additional time will be added to **the end** of the registrar scheduled **synchronous** exam to support students. This way, your exam schedule accurately reflects the **start time** of the exam for any **synchronous** exams. E.g. If a **synchronous** exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the **end** time of the **synchronous** exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm.

Notes:

In order to achieve the prerequisite requirements (i.e., C-) for further Science courses, a student must achieve a minimum 50% weighted average on the summative assessments (2 Term Tests, Wrap-up Assignment, and Final Exam).

This means that if a student scores below 50% on the combined summative assessments, then the *maximum* grade they can obtain in CHEM 203 is a D+.

CHEM 203 **is eligible** for the flexible grading option if a pre-requisite pass (C- or better) is achieved. If you are considering a CG in this course, we encourage you to consult with an advisor in your home faculty to understand the benefits and limitations of this designation in your future studies.

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.

What to do if you have missed a course meeting (lecture, lab, tutorial)

- ***Missed synchronous Lecture:*** Lecture recordings will be available through D2L (barring technical issues) if you need to miss the occasional scheduled lecture due to illness, family circumstances, or other personal conflict. However, attending 'live' whenever possible will help you keep current with the course topics and engage in discussions that support your learning. If you find that you cannot attend due to recurring scheduling issues (e.g. timezone concerns), we recommend that you make a regular schedule to watch the lecture material, rather than trying to catch up on multiple lectures at once. *Please note that there may be a delay of a few days between the date of the lecture and the availability of the recording.*

- ***Missed synchronous Laboratory and/or Tutorial Meeting*:** Laboratory and tutorial sessions are not recorded, to encourage open participation and discussion by all students. You will also work with the same team of peers each week, and your voice and contributions will be missed by your facilitators and peers if

you are not there. If you have a scheduled conflict (e.g. an urgent appointment), please let us know at least a week in advance ; if you miss a meeting unexpectedly, please let us know as soon as possible. Both situations can be shared via the 'Makeup request' option in the Contact Us menu on D2L. **Live participation in your scheduled lab/tutorial is a significant learning opportunity, and missing a session makes completing the follow-up assignment(s) much more challenging.** But, if no scheduled makeup time is available, all required materials will be posted on D2L; the laboratory assignments and weekly check-ins can be completed (despite the absence) before the due date.

What to do if you have missed a laboratory assignment due date

- ***Laboratory assignment due dates posted on D2L serve as 'best before' dates*** - a target submission date for that work. However, extensions of up to 4-days may be requested. Approval of extensions is *automatic* when requested by the 'best before' date.

- *Why 'best before' dates and not 'due dates'? (with credit to Joshua Eyler for this terminology)*
  - Submitting on-time gives you the best opportunity to stay current in the course and allow the teaching team enough time to give you meaningful feedback before your next lab is due. When work is submitted past due, we cannot always guarantee that feedback will be as complete or be provided before your next due date.
  - Sometimes life gets in the way of your ability to submit by the 'best before' date. If you find yourself in this position, you can **request an extension** using the menu option under Contact Us. We invite you to share the reason you need more time, as this information helps us to connect you to support resources as needed. But, you do not need to share unless you feel comfortable doing so - this information will not impact your approval or extension.

- In fairness to your peers, we cannot accept submissions after feedback has been returned to the class, so extensions are generally capped at 4-days. If you are experiencing **exceptional circumstances**, *e.g. needing a longer extension or requesting extensions on multiple occasions*, please connect with the lab coordinator for a conversation. We want to support you in making the best possible plan, which may involve excusing a lab assignment (pro-rating it toward other lab assignments) rather than offering an extension. At the same time, there is a limit on how many assignments can be meaningfully excused while still ensuring that you are able to benefit from the course as a whole. Please connect directly with the lab coordinator as early as possible - *options available to support you are limited if we are unaware of your circumstances until after the fact.*

What to do if you have missed any other course work

- ***Missed Term tests:*** Email the course coordinator (Dr. Carpenter) as soon as you are able. There are no deferred term test examinations. The percentage weight of a legitimately missed term test examination will be pro-rated among the remaining course examinations.

- ***Missed weekly check-in assignments*** will be automatically dropped as the lowest grade(s) in this category, since only the top 5 of 8 check-ins will be counted towards your overall grade. Since these short assignments are primarily meant to help you maintain a routine in the course, late submissions are not accepted. If a you are experiencing extenuating circumstances preventing you from completing a *significant* number of check-ins (e.g. extended illness, etc.), reach out to the course coordinator (Dr. Carpenter) to discuss your situation.

- ***Overdue wrap-up assignments*** will not be accepted beyond the 24-hour grace period, unless you receive approval for an extension from the course coordinator in advance of the due date. Extensions may be granted at the coordinator's discretion for *unexpected* extenuating circumstances. Alternately, the weight of this summative assessment may be pro-rated toward the final exam if the extenuating circumstances make an extension unreasonable. Contact Dr. Carpenter as soon as possible to discuss options.

5. **Scheduled Out-of-Class Activities:**

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

Activity	Location	Date and Time	Duration
CHEM 203 Term Test 1	Web-Based	Wednesday, October 6, 2021 at 6:30 pm	2.5 Hours
CHEM 203 Term Test 2	Web-Based	Wednesday, November 3, 2021 at 6:30 pm	2.5 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.

Each term test time (2.5 hours) includes 100 minutes of writing time plus 50 minutes of additional buffer time to account for technical issues. See Section 7 for additional information on these tests.

6. **Course Materials:**

Recommended Textbook(s):

Flowers, Theopold, Langley, Robinson, et al.,*Chemistry, 2nd edition*: Open Stax.

Important note about your textbook:

Our recommended text is an open-educational resource, freely available online through the Open Stax website (https://openstax.org/details/books/chemistry-2e). You are welcome to (i) refer to the text online, (ii) download the PDF to your own device, or (iii) purchase a print copy.

Recommended practice resources:

Top Hat – Active participation is an important part of your lectures. You are strongly encouraged to participate to the Top Hat activity questions; some questions will be asked during lectures while others will be set as homework to review a lecture or to prepare for an upcoming lecture. Access to Top Hat is free for University of Calgary students. More details will be provided on the first day of lecture.

Technological Requirements:
Specific software that will be used in this course:

- Zoom – for attending lectures/labs/tutorials and office hours.
- Office 365 suite: (Available to ALL UofC students at no additional cost)
  - Excel – or equivalent software. *We strongly recommend installing and running the desktop version of Excel, which best matches the guidance provided for experimental data analysis in this course.*
  - Word – or equivalent word processor.
  - PDF viewer (e.g. Acrobat Reader, Nitro Reader). Preview or in-browser reader is not sufficient.

Access to a tablet, scanner, or free smartphone scanner app that can save documents/photos is **highly recommended**.

General university requirements:

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 exams are **open-book** (resources are allowed), but are to be completed individually by the student.

   All sections will write the **same synchronous examinations** (term tests and final exam) at the scheduled time. Questions are based on input from all instructors for the course. Each exam includes writing time plus a **50% buffer for technical issues**: 100 minutes + 50 minutes for each term test and 2 hours + 1 hour for the final exam. Writing time will be adjusted for students with accommodations through SAS.

   Alternate time 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 seeking such accommodation should contact the course coordinator (Dr. Carpenter) at least 7 days prior to the test date.

   In the event of major technical issues (e.g. frozen screen, power outage, computer failure, etc.), the student should contact the course coordinator immediately either via email or by joining the Zoom help line (by phone or computer, link posted on D2L):

   - If the student is available to re-attempt or continue the timed exam, the start time may be manually reset and the window extended to account for lost time.
   - If the technical issue prevents a student from having sufficient time for completion of the exam within the available window, the weight of the missed online assessment would be redistributed in a similar fashion to any other missed online work (see also **Item 4**).

   Students should also read the Calendar, Section G, on Examinations.

8. **Approved Mandatory And Optional Course Supplemental Fees:**

   There are no mandatory or optional course supplemental fees for this course.

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:**

    If you agree, your course work may be used for research purposes. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested.

    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.

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 (svsa@ucalgary.ca) or phone at 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 (FOIPP). 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 Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: 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.

13. Laboratory Exemptions

Students repeating the course within the last two years can be exempted from the Laboratory sessions and Laboratory assignments in the course if a grade of 75% or higher was obtained on the lab portion.**Attending tutorial activity weeks remains recommended.** Students choosing to exempt from the lab should be aware that,

- the current online labs may be significantly different from prior in-person labs in this course;
- the material covered in these online 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 online 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 September 13th, 2021** 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.

Course Outcomes:

- Use the kinetic molecular theory for ideal gases as a model to explain relationships between temperature, kinetic energy, and reactivity
- Apply principles of chemical equilibria to predict the extent of aqueous chemical changes, including acid/base reactions, dissociation of ionic species, and redox reactions in electrochemical cells
- Identify factors that affect reaction rate, depict reaction rate with graphs and symbols, and explain rates at the molecular level
- Identify the thermodynamic enthalpy and entropy changes associated with a chemical reaction to determine which chemical reactions may or may not occur spontaneously, and describe how to alter that spontaneity.
- Use chemical equations and empirical measurements to solve quantitative problems relating to kinetic, thermodynamic and equilibrium principles
- Communicate the results of chemical changes in terms of observable macroscopic outcomes, molecular-scale models/representations, and mathematical equations. Communicate experimental results with appropriate precision of language and measurement.

Electronically Approved - Sep 01 2021 17:41

Department Approval

Electronically Approved - Sep 02 2021 11:28

Associate Dean's Approval