



COURSE OUTLINE

1. **Course:** CHEM 311, Analytical Chemistry: Quantitative Analysis - Fall 2020

Lecture 01: MWF 08:00 - 08:50 - Online

Instructor	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	403 220-2745	SA 144F	TBA (see D2L)

Online Communication: Please allow up to two business days for replies to email and other online communications. Responses can be expected during business hours of 8 AM - 6 PM on weekdays.

Neither TAs nor the instructor are regularly available outside these business hours. Please use Piazza for maximum visibility of non-personal questions during "off hours".

In Person Delivery Details:

Laboratories ("wet" lab component) will run in-person in SA 169 and 259. Check your Student Centre to see rooms and times for which you are registered. Students will attend their registered lab section on alternating weeks: this schedule will be set during the first week of class and posted to the course D2L.

Completion of the wet-lab component is required in order to pass the course -- if it is not possible for you to attend on-campus sessions, contact the course instructor immediately (before Sept 11 or within 2 days of enrolling in the course, whichever is earlier).

Online Delivery Details:

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

Required synchronous component:

Friday class (lecture) sessions are reserved for group "case study" exercises, which are a graded course component, completed during the scheduled lecture time. These will run every week with the exception of midterm days: midterm exams are scheduled to overlap with Friday class times.

Wednesday class sessions may be used for Q&A and further discussion of posted course material. These sessions will not include any synchronous graded activities and attendance will not be mandatory. These sessions will be recorded and shared on the course D2L site.

Monday class sessions will not generally be used for synchronous content -- if use of this time is needed, at least 5 days advance notice will be posted on the course D2L site, and a recording will be provided for 'lecture' content or Q&A.

All other aspects of the course (lecture/content delivery, assignments, "dry" lab exercises) will be delivered asynchronously.

Course Site:

D2L: [CHEM 311 L01-\(Fall 2020\)-Analytical Chemistry: Quantitative Analysis](#)

Piazza (Q&A): <https://piazza.com/ucalgary.ca/fall2020/chem311>

Sapling Learning & e-text access: <https://www.saplinglearning.ca/ibiscms/course/view.php?id=8234>

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 201 or 211; and 203 or 213; and one of Mathematics 249, 265 or 275.

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)	Weighting %	Date	Note	Mode
Wet Labs (In-person labs) [5 grades]	20%	Various - see D2L	The wet labs and lab notebook together comprise the "wet lab" course component (see Grading Notes below).	Synchronous (in-person)
Lab Notebook [1 grade]	5%	End of Term		Asynchronous (in-person)
Dry Labs (online) [5 grades]	15%	Biweekly - see D2L		Asynchronous (online)
Case Study Assignments [6 grades]	15%	Weekly on Friday	There are 9 assignments, the top 6 of which will contribute towards the final grade. Group and individual assessment.	Synchronous (online)
Homework [10 grades]	5%	Weekly - see D2L	10 assignments, collected for grading 3 times during term	Asynchronous (online)
Midterms [2 exams]	20%	Oct 16, 2020 7:30-8:50 AM Nov 20, 2020 7:30-8:50 AM	2 exams, worth 10% each. Each is a 50 min exam + 50% "buffer time".	Synchronous (online)
Final Exam [1 exam]	20%	TBD (4.5 h)	Scheduled by Registrar during Dec. exam period. 3 hr exam + 50% "buffer time"	Synchronous (online)

For any synchronous assessment, time will be adjusted for SAS students if needed and accommodations for students will be done on a case-by-case basis.

If any student expects to have difficulty completing a synchronous activity during its scheduled timeslot, please contact the course instructor as early as possible to discuss alternate arrangements.

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 has a registrar scheduled final exam.

In order to receive the prerequisite requirements (i.e. a grade of C- or higher) for further Science courses, a student must meet **ALL** of the following requirements:

1. Perform and submit results for at least four of the five "wet lab" in-person lab activities.
and
2. EITHER: Achieve a minimum 55% average on the "wet lab" component (Wet Lab exercises + Lab Notebook)
OR: Achieve a minimum 66% average on all lab components (Wet Lab exercises + Lab Notebook + Dry Lab exercises)
and
3. Achieve a minimum 50% weighted average on the examinations (2 Midterms + 1 Final).

This means that if a student scores below 50% on the exam average, OR does not achieve the minimum lab grade, OR misses more than one lab exercise (for any reason), the maximum grade they can obtain in CHEM 311 is a D+.

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, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

There is **no make-up lab section** in CHEM 311. If you are unable to attend your scheduled lab section, notify the course instructor as soon as possible. All make-up labs must be performed in the same 2-week cycle as the missed lab. As such, as much advance notice as possible is needed in order to find available space to perform make-up experiments for excused absences. A minimum of **48 hours** notice (after the missed lab) for emergency absences or illness is required, and **10 business days** ADVANCE notice (before the missed lab) for scheduled absences such as doctor's appointments or religious observance. Due to scheduling and restrictions on lab occupancy, it may not be possible to make up a missed experiment even if sufficient notice is supplied. In such cases the weight of the missed lab activity will be distributed over the remaining "wet-lab" activities. Please note the course policies on minimum number of labs completed in Section 3.

There are **no deferred midterms**, however some accommodations may be made for time zone adjustment and technological issues in submission. If you are unable to write either midterm exam during the scheduled time, notify the instructor either **10 business days in advance** for scheduled absences or course conflicts, or **within 48h** of the missed exam for emergency absences so that alternate arrangements can be made. If it is not possible to complete the exam within the exam writing window, the weight of the missed exam will be shifted to the final exam.

For all other absences or missed deadlines, contact the course instructor following the instructions above. Failure to provide timely notice or absences for non-excusable reasons (e.g. late arrival or safety violations in lab) will result in a grade of 0 for the missed course component.

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

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

Activity	Location	Date and Time	Duration
Midterm 1	Web-Based	Friday, October 16, 2020 at 7:30 am	1.5 Hours
Midterm 2	Web-Based	Friday, November 20, 2020 at 7:30 am	1.5 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.

If the exam time for CHEM 311 conflicts with a scheduled activity in another class, email Dr. Musgrove **with a copy of your schedule** for the Thursday and Friday of the exam as early as possible - at minimum **10 business days** before the exam - so that accommodation can be made. Late notice may mean that finding an adjusted writing time in the exam window is not possible.

If the out of class activity *for another course* conflicts with scheduled activities in CHEM 311, contact the coordinator/instructor of the other course at least 10 business days before the date of the out-of-class activity so that alternative arrangements may be made. CHEM 311 (especially the labs) cannot accommodate schedule changes due to overlap from other courses' activities.

6. Course Materials:

Recommended Textbook(s):

Daniel C Harris and Charles A Lucy, *Quantitative Chemical Analysis, 10th edition*: MacMillan Learning.

Older editions of the textbook may be used. Readings and assignments will be supplied for the 9th edition; for older editions students are responsible for translating the provided readings on their own initiative.

Required laboratory materials:

- Lab coat (full length / knee length)
- Safety glasses or goggles - CSA approved, with side shields
- Hardcover, permanently bound laboratory notebook (such as the blue and black "lab notes" and "physics notes" books available from the Bookstore)
- Masks are required in indoor public areas on campus and strongly recommended while in lab.
If you will wear a mask in the lab: Non-medical masks made of heat-resistant material - at least 2 (note: many common disposable masks are not suitable - see course D2L for details on material specs and requirements)

Technological Requirements:

This course will have in-class discussion via Zoom: Use of a webcam and microphone during these sessions will be beneficial.

Specific software that will be used in this course:

- **A modern web browser** – for accessing D2L and viewing course videos and other content.
- **Zoom** – for attending lecture and office hours. Required for completing the Case Study activities.
- **Office 365 suite:** (Available to students at no additional cost)
 - OneNote – for accessing notes and assignments.
 - Excel – full version, not iOS or web version – or equivalent software.
 - Word – or equivalent word processor.
- **PDF viewer** (e.g. Acrobat Reader, Nitro Reader). Preview or in-browser reader is not sufficient.
- A **scanner** or phone app that can save documents/photos as PDF (e.g. OneDrive app).

General university requirements:

See general requirements at <https://elearn.ucalgary.ca/technology-requirements-for-students/>.

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:

Midterm and final exams are "open-notes". Reference to your course notes, textbook (electronic or paper edition), and select 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 each exam. All exams are to be completed individually by the student submitting the exam.

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.

For any synchronous assessment, time will be adjusted for SAS students if needed and accommodations for students will be done on a case-by-case basis. Any student with academic accommodations must be registered with Student Accessibility Services (see Section 12(e) below), and have reviewed their accommodations as described on the SAS documents with the course coordinator within the first 15 days of the semester or at least 10 business days before any scheduled activity for which accommodations are required. An email confirming mutual understanding of the accommodations will suffice.

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 50 min exam with 25 min "buffer", for a total of 75 min. A student with a 25% time accommodation would receive $50 + (50 \times 25\%) + 25 = 87.5$ min as their adjusted length.

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: Due to administrative closures in the Fall 2020 term, the normal laboratory check-out and breakage fees are suspended. However, you may be charged for damages to equipment resulting from negligent or unsafe behaviour at the rates described in the lab manual and at check-in.

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.

A form is provided on the course D2L site and should be used when requesting reappraisal of term work.

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 Center:** 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/policies/files/policies/sexual-violence-policy.pdf>)
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**
- e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Chemistry, Dr. Yuen-Ying Carpenter by email ahugchem@ucalgary.ca or phone 403-220-6908. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- 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](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.

13. **Assembly Points:** In case of emergency during lab time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#). The assembly point for Science A is the [Social Science food court](#).

14. **Laboratory Information:** Laboratory activities will begin the week of September 14, 2020.

It is mandatory that students wear a lab coat and safety glasses at all times when working in the lab. Students wearing inappropriate laboratory attire will not be permitted to conduct experiments for safety reasons. The manual can be found online (course D2L site). You must consult the online laboratory manual prior to attending any of your scheduled lab periods and printout or transfer to your lab notebook the portion of the manual that

outlines the procedures you will be doing.

Any student with academic accommodations that may impact their ability to perform experiments in the time and format required must be registered with Student Accessibility Services (See Section 12(e) above) and have reviewed their accommodations as described on the SAS documents with the laboratory coordinator within the first 15 days of the semester or at least 10 business days before any scheduled activity for which accommodations are required. An email confirming mutual understanding of the accommodations and their application to lab will suffice.

15. Laboratory Exemptions. Students repeating the course within the last two years can be exempted from the Wet Lab component of the course (See Section 3) if a grade of 75% or higher was obtained on the lab portion. Students choosing to exempt from the wet lab should be aware that,

- the material covered in the wet 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 wet 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 14th, 2020 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.

16. 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: information can be found at <https://science.ucalgary.ca/chemistry/safety/training-and-procedures>. 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 pre-labs 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 sources of uncertainty in chemical measurements, and use appropriate statistical analysis methods to describe and quantify uncertainty.
- Using equilibrium principles, quantitatively and qualitatively describe the composition of solutions (acids and bases, chelation complexes, precipitates, and redox couples).
- Identify, explain, and apply common techniques in quantitative analysis, focussed on titrimetry.
- Describe the effect of concentration on a mixture through changes in chemical activity and electrical potential.
- Perform chemical manipulations with high accuracy and precision.
- Keep laboratory records that conform to professional and ethical standards.

Electronically Approved - Aug 31 2020 19:03

Department Approval

Electronically Approved - Sep 01 2020 15:02

Associate Dean's Approval