



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF CHEMISTRY  
COURSE OUTLINE

1. **Course:** CHEM 311, Analytical Chemistry: Quantitative Analysis -- Fall 2018

Instructor Name	Email	Phone	Office	Hours
L01: ( TR 12:30 - 13:45 in KNB 132) Amanda Musgrove	amanda.musgrove@ucalgary.ca	403-220-2745	SA 144F	TBA

Laboratory sessions begin September 10<sup>th</sup>.

**Course Site:**

D2L: CHEM 311 L01-(Fall 2018)-AnalyChem:QuantitativeAnalysis

Piazza: <https://piazza.com/ucalgary.ca/fall2018/chem311>

**Department of Chemistry:**

Office: Science A 229

Phone: 403 220-5381

Email: chem.info@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 201 or 211, and 203 or 213, and Mathematics 249 or 251 or 265 or 275 or Applied Mathematics 217.

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
Assignments (5)	10 %	—
Lab Exercises (7)	30 %	—
Lab Notebook (1)	5 %	—
Midterm Test (1)	20 %	October 24, 7-9 PM. Room TBA
Final Exam	35%	Scheduled by Registrar

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
<b>Minimum % Required</b>	92. %	86. %	82. %	78. %	74. %	70. %	66. %	62. %	66. %	54. %	50. %

In order to achieve the prerequisite requirements (i.e., C-) for further Science courses, a student must meet ALL of

the following requirements:

1. Perform and submit no less than five of the laboratory analyses, **and**
2. Achieve a minimum 50% weighted average in the laboratory component (Exercises + Notebook), **and**
3. Achieve a minimum 50% weighted average on the examinations (Midterm and Final).

This means that if a student scores below 50% in either the laboratory or the examinations, or misses more than two of the lab exercises, then the maximum grade they can obtain in CHEM 311 is a D+.

In determining the laboratory exercises grade, each analysis completed by the student will be assigned a grade of 1 to 5. The single lowest non-zero report grade will be dropped (a grade less than 2.0/5 requires completion of an out-of-spec report to be dropped). An average grade out of 5 will be calculated, and converted to a percentage.

This course has a registrar scheduled final exam.

#### 4. Missed Components of Term Work:

The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself/themselves with these regulations. See also [Section E.3](#) of the University Calendar.

There are no deferred Midterm examinations. In the event that a student misses the midterm or any course work due to illness, then an official medical note will be required. Absences must be reported **within 48 hrs** of the missed course work. If a student misses the midterm for other reasons, then analogous documentation will be required. If the exam will be missed due to a religious observance, Varsity sports competition, or other protected grounds must submit documentation **no less than 14 days before** the exam. Conflicts with an out-of-class exam must be registered with the course instructor **no less than 14 days** before the date of the exam so that alternate arrangements can be made.

The course coordinator will need to see the original documentation (not an electronic copy) for review / decision and keep it (or a copy) for their records. The documentation must be provided to the course coordinator **within 15 days** of the date of the midterm in order for an excused absence to be considered. If an excused absence is approved, then the percentage weight of a legitimately missed midterm examination will be transferred to the final examination.

There is no make-up lab section. If a laboratory experiment is missed due to illness or other reason, the absence should be reported to the instructor within 48 hours of the missed laboratory. For absences known in advance (religious observance, Varsity sports, etc) notification must be given no less than 14 days before the lab to be missed. If the lab was missed for excusable reasons (following the same policies as for midterm exams), an exemption or opportunity to attend an alternate section may be offered. If the laboratory is missed for non-excusable reasons (e.g. vacation, improper lab attire), a grade of zero will be assigned for that lab exercise. Note the course policies on minimum number of labs completed in Section 3.

#### 5. Scheduled out-of-class activities:

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

Activity	Location	Date and Time	Duration
CHEM 311 Midterm Exam	TBA	Wednesday, October 24, 2018 at 7:00 pm	2 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 you have a conflict with the CHEM 311 midterm as scheduled above, contact the course instructor as soon as possible (no later than 14 days prior to the exam) with a copy of your schedule for that week so that an alternative arrangement may be made. Non-academic conflicts (e.g. work shifts) are not generally eligible for accommodation.

## 6. Course Materials:

Recommended Textbook(s):

Daniel C. Harris, *Quantitative Chemical Analysis, 9th Ed*: W.H Freeman and Company .

Alternate resource:

*Analytical Chemistry 2.1*: David Harvey, 2016, published online:  
[http://dpuadweb.depauw.edu/harvey\\_web/eTextProject/version\\_2.1.html](http://dpuadweb.depauw.edu/harvey_web/eTextProject/version_2.1.html)

Use of this textbook is **experimental**; students may be required to supplement readings from Analytical Chem 2.1 with material from Harris (above) for some course topics.

A laboratory manual is provided on the course D2L site as a PDF file.

## 7. Examination Policy:

All examinations are closed-book. A formula & data sheet will be provided with the exam, and a **non-programmable** scientific calculator may be used. No other aids are allowed.

Any student with academic accommodations must be registered with Student Accessibility Services (see Section 12(f) 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 days before any scheduled activity for which accommodations are required.

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 (December 7, 2018). 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 last day of the final examination period of the term, an additional \$10.00 administrative fee will be charged and 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:

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.

1. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **15 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 immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections [I.1](#) and [I.2](#) of the University Calendar

2. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

Students should note the policy on lab Report of Analysis submissions provided in the course laboratory manual.

## 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:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. 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](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208).
- 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. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **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. Farideh Jalilehvand by email [ahugchem@ucalgary.ca](mailto:ahugchem@ucalgary.ca) or phone [403-220-5353](tel:403-220-5353). 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.
- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. **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.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).

- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **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.

**Laboratory Information:** Laboratory activities will begin the week of **September 10**. 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 the required portion of the manual that outlines the procedures you will be doing.

Students repeating the course within the last two years can be exempted from the Laboratory Component of the Course if a grade of 75% or higher was obtained. The lab grade achieved on the previous attempt will be carried forward. Such students must contact the Chemistry Undergraduate Program Administrator in the Chemistry Main Office, SA 229 before the drop date (September 13th, 2018).

**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 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.

<b>Department Approval:</b>	Electronically Approved	<b>Date:</b> 2018-08-30 09:42
<b>Associate Dean's Approval for out of regular class-time activity:</b>	Electronically Approved	<b>Date:</b> 2018-08-30 12:05

## Course Outcomes

- Calculate confidence intervals from replicate analyses.
- Apply simple student t-tests to detect bias in analytical measurements
- Use Debye-Huckel theory to quantitatively determine the influence of ionic strength on various aqueous equilibrium systems
- Formulate systems of simultaneous equations allowing for the complete solution of systems involving multiple equilibria
- Calculate acid calculate concentrations in acid-base equilibrium systems, including those involving polyprotic and polybasic species.
- Calculate EDTA titration curves.
- Laboratories: Carry out various wet chemical analyses with high precision.