UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

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

COURSE OUTLINE

1. **Course:** CHEM 315, Analy Chem:Intro Instrument Analy - Winter 2024

Coordinator(s)

Name	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	--	SA 144F	By appointment: http://ow.ly/Lh4F50HeFPn

Section(s)

Lecture 01 : MWF 10:00 - 10:50 in ENG 60

Instructor	Email	Phone	Office	Hours
Dr. Amanda Musgrove	amanda.musgrove@ucalgary.ca	--	SA 144F	By appointment: http://ow.ly/Lh4F50HeFPn

Please allow up to **2 business days** for a response to questions via email. Check D2L for a schedule of drop-in office hours, and how to book an appointment for individual office-hours visits.

Please put **CHEM 315** in the subject line of all emails to get the most accurate response.

To account for any necessary transition to remote learning for the current 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:

All components of this course are completed in-person, during the scheduled course times. Lectures are not recorded or streamed online, and will include a mixture of traditional lecturing and problem-solving activities. Students may be asked to prepare for lecture or lab by watching videos, reading from online sources or the course textbook, or reading provided notes. When advance preparation is required, your instructor will try to give at least one week advance notice (on D2L) of the preparatory material.

In-person laboratory activities begin Monday January 8, 2024.

Course Site:

D2L: CHEM 315 (Winter 2024)

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 311.

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
Homework[1]	10%	Ongoing		
Laboratory Notebook[2]	10%	Ongoing		
Laboratory Analyses[3]	0%	Ongoing		
Midterm 1[4]	20%	Feb 09 2024 at 10:00 am (50 Minutes)	in-person	In class
Midterm 2[5]	20%	Mar 15 2024 at 10:00 am (50 Minutes)	in-person	In class
Registrar Scheduled Final Exam	40%	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] Approximately weekly assignments on the Achieve platform (link on D2L). Achieve may be purchased for home use or used free of charge in TFDL.
[2] Notebook is graded twice during term - see D2L for schedules.
[3] Laboratory analysis grades contribute directly to the overall course grade: see information below. There are 8 analyses during term, approximately weekly.
[4] Each midterm has a base weighting of 16%, with the remaining 8% assigned to the higher scoring of the two exams.
[5] See note for Midterm 1.

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 %	86 %	82 %	78%	74%	70 %	66 %	62%	58%	54 %	50 %

Grading of the laboratory component:

For the 8 analysis labs, you will hand in a numerical **report of analysis**, which will be graded on a qualitative scale (from highest credit to lowest):

- HP – “high pass” – the accuracy of the analysis is excellent: it exceeds quality standards for the course.
- P – “pass” – The accuracy of the analysis is acceptable: it meets the course quality standards.
- NI – “needs improvement” – The accuracy of the analysis did not meet the course quality standards.
- X – “not accepted” – The report was not submitted or did not meet minimum requirements for a report of analysis. Analyses that were not performed during regularly scheduled lab time receive a grade of “X”.

Achievement in the lab portion of the course can affect your course letter grade:

- With a minimum of 6 analyses with “P” or higher, including at least 4 analyses with “HP”:
  - Increase of 2 letter grade divisions, to a maximum of *A*.
- With a minimum of 6 analyses with “P” or higher, including at least 2 analyses with “HP”:
  - Increase of 1 letter grade division, to a maximum of *B*.
- With a minimum of 5 analyses with “P” or higher:
  - Increase of 1 letter grade division, to a maximum of *C*.
- With a minimum of 5 analyses with “NI” or higher, including at least 4 analyses with “P” or higher:
  - No modification to the letter grade.
- With either fewer than 5 analyses with “NI” or higher, or fewer than 2 analyses with “P” or higher:
  - A maximum grade of *D+* in the course will be assigned (*D, D+,* or *F)*, based on the percent-to-grade conversion of the remaining course components.

The value of the overall course grade will be determined based on the course component weightings and letter grade conversions described above.
See section on laboratory exemptions for grade conversions for this purpose.

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 3 hours.

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

1. Earn a minimum of 5 grades of “NI” or higher, including at least 2 analyses with “P” or higher, on the laboratory portion of the course
   AND
2. Achieve a minimum 50% or higher weighted average on the written examinations (midterm and final)
   OR
   Achieve a minimum 50% grade on the final exam.

This means that if a student scores below 50% weighted average on the examination component AND scores below 50% on the final exam, OR if they do not obtain at least the minimum grade in lab, then the maximum grade they can achieve in CHEM 315 is a D+.

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:**

In the event that a student legitimately fails to submit any online or in-person assessment on time (e.g. due to illness, domestic affliction, 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, or possible exemption and reweighing of components. Absences not reported within 48 hours will not be accommodated. Students may be asked to provide supporting documentation (Section M.1) for an excused absence, See FAQ.

If an excused absence is approved, options for how the missed assessment is dealt with is at the discretion of the coordinator or course instructor. Some options such as an exemption and pro-rating among the components of the course may not be a viable option based on the design of this course.

There is **no weekly make-up lab section** in CHEM 315. Note that up to 2 absences in the laboratory portion of the course can be accommodated without penalty in the grading scheme. If you have missed or will miss a laboratory activity, notify your instructor, Dr. Musgrove, within 48 hours of the missed lab. If it is possible to make up the lab at a later time, you will be notified.

If you will miss a **midterm exam**, the grading weight for this exam will be shifted onto the final exam. The "flexible" 8% will be put onto the other midterm exam. There are no deferred or make-up midterm exams.

Homework assignments may be submitted after the due date with a small grade penalty (see details attached to each assignment).

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

There are no scheduled out of class activities for this course.

6. **Course Materials:**

Recommended Textbook(s):

Daniel C Harris and Charles A Lucy, *Quantitative Chemical Analysis, 10th ed*: W H Freeman and Company / Macmillan.

For in-person examinations:

- A non-programmable, non-graphing scientific calculator (similar to Sharp El-520X or Casio FX300MS)

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).
- Computer running the *full* (not mobile / iOS) version of Microsoft Excel or equivalent software.

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 examinations and homework assignments are to be completed individually by the student submitting the exam.

   Midterm and final exams are **closed-book**. A non-programmable scientific calculator may be used. A data sheet is provided for use during the exam. A single handwritten data sheet may also be used, and must be handed in with the exam for grading. See D2L for restrictions and requirements for the format and content of the handwritten data sheet.

   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 business days before any scheduled activity for which accommodations are required. An email confirming mutual understanding of the accommodations will suffice.

   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:**

    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 a s 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 t o 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 their website 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 here.

    d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.

    e. **Student Union Information:** SU contact, Email your SU Science Reps: science1@su.ucalgary.ca, science2@su.ucalgary.ca, science3@su.ucalgary.ca,

    f. **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 Associate Head, Undergraduate by email ahugchem@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

g. **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
   Faculty of Science Academic Misconduct Process
   Research Integrity Policy

   Additional information is available on the Student Success Centre Academic Integrity page

h. **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.

i. **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.

j. **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 January 8, 2024.

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.

Laboratory Exemptions

Students repeating the course within the last two years can be exempted from the Laboratory Component of the course if their laboratory was completed within the past two years and a grade of 75% or higher was obtained.

The previously obtained percentage grade on the laboratory component will be applied directly to the Lab Notebook grade component. A percentage grade on the laboratory component will be applied to the four lab grade categories using the percentage cutoff for the A, B, C, and D letter grade percentages respectively. Laboratory analysis grades will be passed to future course iterations as letter grades (A B C D or F), and where necessary, the median % grade for the corresponding letter will be taken as the numerical grade - based on the grade conversions in the course outline.

Students choosing to exempt from the lab should be aware that there may be differences between the current labs and those

performed in your previous semester the material covered in labs may be integrated into non-lab-based course assessments and the lab grade achieved on the previous attempt will be carried forward.

Students exempted from the Laboratory Component will still be evaluated on all other course components.

Prior to applying for an exemption, students are STRONGLY encouraged to connect with their course instructor to better understand the risks and benefits in their specific course, as well as which grades will be carried forward. Instructors can tell you what access you will have (or not have) to lab materials as an exempt student, and how the lab materials may be integrated.

Students applying for a lab exemption should contact the Undergraduate Science Center (science.advising@ucalgary.ca) no later than Thursday January 18, 2023 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.

Academic Accommodations in the Laboratories

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(f) 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: note that some types of recommended accommodations may require advance notice in order to implement, or may need modification to be possible in the teaching laboratories.

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 towards 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:

- Describe the relevance of instrumental analytical chemistry in modern society
- Identify common pitfalls in the analytical measurement process: sample collection, sample preparation, measurement, quality assurance and quality control (QA/QC)
- Recognize operating principles of analytical measurement processes (i.e., spectroscopy, chromatography, sample preparation)
- Explain the basic operating principle of common building blocks of analytical instruments
- Decide which instrumental techniques are most appropriate to solve an analytical problem
- Develop hands-on skills to execute analytical measurements in order to achieve accurate and precise analytical results (i.e., pipetting, reading a balance)
- Demonstrate hands-on troubleshooting skills with regard to the operation of analytical instruments
- Practice recordkeeping that conforms to professional and ethical standards

Electronically Approved - Jan 05 2024 14:45

Department Approval