



COURSE OUTLINE

1. **Course:** CHEM 471, Physical Chemistry: Kinetics and Spectroscopy - Winter 2024

Lecture 01 : MWF 11:00 - 11:50 in AD 140

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

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 course components, including lectures, tutorials, and laboratories, will be delivered in-person whenever deemed possible and safe by the University.

Lectures will start on **Monday, January 8, 2024**.

Tutorials will start on **Monday, January 15, 2024**. Details and a schedule of the tutorial activities will be available on D2L.

Labs will start the **week of January 8, 2024**. Laboratories assessment include three submitted laboratory exercises and one independent project; details and a schedule of activities will be available via D2L.

Course Site:

D2L: CHEM 471 L01-(Winter 2024)-Physical Chemistry: Kinetics and Spectroscopy

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 371 and 373.

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
Laboratory ¹	25%	Ongoing		
Tutorials ²	10%	Ongoing		
Test 1 ³	10%	Jan 26 2024		
Test 2 ⁴	10%	Feb 16 2024		
Test 3 ⁵	10%	Mar 15 2024		
Registrar Scheduled Final Exam	35%	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 See the Lab Schedule in the Lab Manual. The schedule for the 11 week laboratory component can be found on pages 7-8 in the Lab Road Map document. The three lab experiments, weighted 51% of the lab component, are to be completed during the first five weeks of the laboratory. The lab work for the Independent Project is to be performed in the next five weeks. The last week of the CHEM 471 laboratory is reserved for the Independent Project presentations. The weight for the Independent Project is 49% of the lab component.

² There will be 10 tutorials. Please see the schedule for the tutorials in D2L. The tutorial grade will be determined by using the best 8 out of 10 tutorials.

³ All tests will take place in the classroom. You will have 50 minutes to complete the in-person tests.

⁴ All tests will take place in the classroom. You will have 50 minutes to complete the in-person tests.

⁵ All tests will take place in the classroom. You will have 50 minutes to complete the in-person tests.

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 %	87 %	82 %	78%	74%	70 %	66 %	62%	58%	54 %	50 %

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

In order to satisfy the prerequisite requirements (i.e., C-) for further Chemistry courses, a student must meet the following requirements: (1) achieving a passing grade (i.e., a minimum 50%) in the laboratory grading component. AND (2) achieving a passing grade (i.e., a minimum 50%) for the non-laboratory components (the weighted average of the tests and final examination). This means that if a student scores below 50% in either the laboratory component or weighted average of the non-laboratory component, the maximum course letter grade they can obtain in CHEM 471 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 will be no deferred tests in CHEM 471. If a student is unable to attend any other in-class tests, then the weight assigned to the test will be pro-rated to the other tests (if applicable) and the final exam.

Students must meet with the course instructor to discuss alternative assessment if they miss any of the three lab exercises.

Absences for any test or lab component not reported within 48 hours will not be accommodated.

5. Scheduled Out-of-Class Activities:

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

6. Course Materials:

Recommended Textbook(s):

Thomas Engel and Philip Reid, *Thermodynamics, Statistical Thermodynamics, and Kinetics, 4th Edition*: Pearson.
Thomas Engel, *Quantum Chemistry and Spectroscopy, 4th Edition*: Pearson.

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:

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

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

7. Examination Policy:

- All tests and the final examination (regardless of format) are to be completed individually by the student, with no communication with other persons.

- All tests and the final examination are to be in-person.

- Any in-person assessment will be closed-book, and no resources (other than a non-programmable calculator) or references are allowed during assessment.

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 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 their [website](#) 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 (svsa@ucalgary.ca) or phone at [403-220-2208](tel: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.

13. Lab Exemption

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

- the labs in Winter 2024 may be significantly different from prior labs in this course;
- the material covered in these labs will be integrated into other course assessments;
- and the lab grade achieved on the previous attempt will be carried forward.

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

Students applying for an exemption should contact the Undergraduate Science Center (science.advising@ucalgary.ca) no later than **Thursday January 18th, 2024** 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.

14. Laboratory Safety Course

All undergraduate students taking chemistry laboratories are required to complete an introductory course (approximately 50 minutes) on laboratory safety. This course is presented in an online format and must be completed prior to the first in-person laboratory. 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:

- Determine the rates of chemical reactions and relate the laws describing those rates to the mechanisms of reactions; explain the transition state theory and apply it to predict the reaction rates.
- Demonstrate an understanding of rotational, vibrational, and electronic spectroscopy and nuclear magnetic resonance; apply this knowledge to explain the underlying principles of different spectroscopic techniques.
- Have the capacity to engage in an independent research project.
- Critically assess and analyze interim kinetics and spectroscopic experimental results and adjust the experimental plan if necessary; design and conduct control experiments to support experimental findings.
- become expert users of the spectroscopic equipment in the Physical Chemistry laboratory; strengthen lab skillsB
- Participate actively in a group at all stages of working on the research project; communicate research ideas and findings effectively both in written and oral format.

Electronically Approved - Jan 05 2024 14:46

Department Approval