



## COURSE OUTLINE

### 1. **Course:** CHEM 471, Physical Chemistry: Kinetics and Spectroscopy - Winter 2021

Lecture 01: MWF 12:00 - 12:50 - Online

Instructor	Email	Phone	Office	Hours
Dr Yujun Shi	shiy@ucalgary.ca	403 210-8674	SB 301	TBA

#### **In Person Delivery Details:**

##### Laboratories

**The laboratories will be delivered in person.** There will be three laboratory exercises and one independent project. Should a student not be able to attend ANY labs in-person due to extenuating circumstances (e.g., at risk or living with someone at-risk), the student should contact Dr. Shi by January 13 (or within 3 days of enrolment in the course) and accommodations for students will be granted on a case-by-case basis.

#### **Re-Entry Protocol for Labs and Classrooms:**

To limit the spread of COVID-19 on campus, the University of Calgary has implemented an Instructional Space Re-Entry Protocol that must be followed. Details are found in the [Covid-19 Protocol for Class and Lab re-entry.pdf](#) document. **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.

**All Chem 471 lectures will be synchronous.** Students are expected to be present for all lectures via Zoom during the scheduled time. However, lecture will recorded and posted on D2L in case students are unable to attend some lectures. **Lecture will start on January 11, 2021.**

**All Chem 471 tutorials will be asynchronous.** Each week, a set of practice problems related to the content covered in lectures will be assigned. Students will be asked to watch videos and review assigned readings. **Tutorials will start in the week of January 18-22, 2021.**

#### **Course Site:**

D2L: CHEM 471 L01-(Winter 2021)-Physical Chemistry: Kinetics and Spectroscopy

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

**Office hours:** Office hours will be virtual via the ZOOM platform and students will have to register to the meeting in order to get access to the link. More information will be provided in the first lecture.

### 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:

Components	Weighting (%)	Date
Quizzes (in class)	40	Various Dates (See schedule below)
Laboratory	25	See Lab Schedule in the Lab Manual
Final Examination	35	To be scheduled by Registrar
Total	100	

### Synchronous In-class Quizzes Schedule

There will be four in-class quizzes during the scheduled lectures that will be synchronous. Information on specific dates is provided below. Students will have access to the quizzes at the beginning of the scheduled lecture. The quizzes are designed to be completed in 30 minutes but students will be provided with 45 minutes in order to account for any technical issues.

Quiz #	Scheduled time
1	Wednesday January 27, 12:00 - 12:45 pm
2	Wednesday February 24, 12:00 - 12:45 pm
3	Monday March 15, 12:00 - 12:45 pm
4	Monday March 29, 12:00 - 12:45 pm

For any synchronous assessment, time will be adjusted for SAS students if needed. As well, 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 who need accommodation for one or all of the quizzes must inform Dr. Shi no later than Monday, January 18, 2021 at 11:59 pm via email for it to be considered. Should circumstances change for a student since the start of the term, the student must contact Dr. Shi at least one week before the specific quiz time.

### Laboratory

The schedule for the 11-week laboratory work can be found on p. 7-8 in the Lab Road Map document. The three lab exercises, weighted 49% of lab marks, are to be completed in the first 5 weeks. The lab work for the Independent Project will be performed in the next 5 weeks and the last week of Chem 471 lab is reserved for the Independent Project presentations. The weight for the Independent Project is 51% of lab marks. The lab marks are worth 25% of the final course grade.

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

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) achieve a passing grade (i.e., a minimum 50%) for the non-laboratory components (the weighted average of the quizzes 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+.

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. - updated April 6, 2021**

#### 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.

#### 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.  
Thoma 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:

- 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:

Students who require accommodation must be registered with Student Accessibility Services (SAS)(see section 12 (e) below), and must identify themselves to their instructor as soon as possible.

For any synchronous assessment (quizzes, final exam), time will be adjusted for SAS students if needed. As well, 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*. There will be four synchronous in-class quizzes during the scheduled lectures. Information on specific dates is provided in Section 3 (Grading). Students who need accommodation for one or all of the quizzes must contact Dr. Shi before January 18, 2021 at 11:59 pm. Should circumstances change for a student since the start of the term, the student must contact Dr. Shi at least one week before the specific quiz time.

In Chem 471, there will be a final examination that will be scheduled by the Registrar. The final examination is designed to be completed in 2 hours, however students will be given 3 hours to complete it in order to account for any technical issues. The final examination is synchronous, which means all students start writing at the same time and end at the registrar scheduled exam end time.

In Chem 471, all the quizzes and the final examination are open-book. Reference to your course notes, your own formula sheet, or your own textbook (electronic or paper edition) are allowed. It is suggested that you create your own formula sheet that included important formulae and constant values. No other aids are allowed on quizzes and/or the final examinations, including accessing internet resources such as search engines (Google, etc.), other websites, shared documents (Google docs, etc.) or chat servers (Discord, WhatsApp, etc.), and you are specifically prohibited from working or contacting any other individuals while you complete the quizzes and/or the final examination. It is important to note that the time required for browsing your own course notes or textbook is not taken into consideration when evaluating the time it requires to complete the quizzes and/or the final examination. This is why it is strongly advised that you create your own formula sheet for an easy access to formulae and constant values.

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 [www.ucalgary.ca/wellnesscentre](http://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 ([svsa@ucalgary.ca](mailto: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 at (<https://www.ucalgary.ca/policies/files/policies/sexual-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:** 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](mailto: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 (FOIP). 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](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: [ombuds@ucalgary.ca](mailto: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. *Lab exemptions.* 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 on the lab portion. Students choosing to exempt from the lab should be aware that,

- 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 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 lab materials or feedback as an exempt student.

Students applying for a lab exemption should contact the Undergraduate Science Center ([science.advising@ucalgary.ca](mailto:science.advising@ucalgary.ca)) **no later than Monday January 18th, 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.

#### **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 - Apr 06 2021 16:04

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**Department Approval**

Electronically Approved - Apr 06 2021 16:29

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**Associate Dean's Approval**