



## COURSE OUTLINE

1. **Course:** CHEM 371, Physical Chemistry: Thermodynamics Chemistry - Fall 2021

Lecture 01: MWF 10:00 - 10:50 in ENE 239

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

### In Person Delivery Details:

Lectures: **Blended**

Recorded lecture videos will be prepared and posted to D2L. There will not be a scheduled class on Mondays. The lecture time on Wednesdays and Fridays will be used for in-person lectures, demos and homework review.

Labs: **In-person**

All labs will be delivered in person. Students are required to attend their scheduled lab section. Accommodations for missed labs will be made on a case-by-case basis. Additionally, prior to their scheduled lab, students will need to read the appropriate section of the lab manual and complete a prelab quiz. Further details about the labs will be provided during the first lecture, on D2L and in the lab manual.

Tutorials: **Blended**

Tutorials will be a blended delivery. Students are required to attend their scheduled tutorial section. Tutorials will operate on a biweekly cycle. During the first week of each cycle, students will work in small groups to solve assigned exercise problems (this component may be moved to a synchronous Zoom session). During the second week of each cycle, students will write a tutorial quiz in-person. Further details about the tutorials will be provided during the first lecture and on D2L. The first tutorial will take place on Monday, September 13, 2021.

D2L:

D2L will be the primary source of information for the course. All changes to the required activities and course delivery will be announced there, with any changes posted with at least 1-week notice.

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

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#). **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.

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.

Lectures: **Monday lectures are asynchronous.**

Recorded lecture videos will be prepared and posted to D2L. These will take the place of the Monday lectures.

Tutorials: **Alternate weeks may be offered online via synchronous Zoom.**

The first week of each biweekly tutorial cycle may be moved to a synchronous Zoom component. This will be decided based on student poll during the first tutorial cycle. This will be announced in class and on D2L at least one-week before.

### Course Site:

D2L: CHEM 371 L01-(Fall 2021)-Physical Chemistry: Thermodynamics Chemistry

**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; Physics 223 or admission to a Major program offered by the Department of Physics and Astronomy and 6 units of Physics; and Mathematics 267 or 277.

### Antirequisite(s):

Credit for Chemistry 371 and any of Physics 347, 349, or 447 will not be allowed.

## 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                                      | Notes  |
|--|-------------|---|--|
| TopHat homework assignments (weekly)   | 5%          |   |  |
| Tutorials (5 exercise and quiz cycles) | 20%         | See D2L                                   | Up to one absence from the 5 total quizzes will be excused automatically. If a student does not use the excused tutorial absence, the lowest tutorial grade will be dropped. |
| Laboratory (8 experiments/labs)        | 30%         | See D2L                                   |  |
| Midterm Exams (in class, 50 min.)      | 20%         | Friday, October 15<br>Friday, November 19 | Two exams, each worth 10%.   |
| Final Exam (2 hours)                   | 25%         | to be scheduled by the registrar          |  |

Quizzes and exams are all administered in-person.

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 % | 77% | 72% | 67 % | 62 % | 58% | 54% | 50 % | 45 % |

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.

Students will be expected at every stage to understand the material covered in all components of the course.

In order to obtain a grade of C- or higher (necessary to satisfy the prerequisite requirements for further Chemistry courses), a student must meet the following requirements: (1) achieve a minimum 50% in the laboratory, and (2) achieve a minimum 50% weighted average on the Midterm exams, Final Exams and Tutorial quizzes. If conditions (1) and (2) are **both** not satisfied, the the maximum course letter grade a student can obtain in CHEM 371 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:

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, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

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

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

#### 6. **Course Materials:**

Required Textbook(s):

Thomas Engel and Philip Reid, *Physical Chemistry, 4th Edition*: Pearson.

Required: Chemistry 371 Laboratory Manual (available online from the course D2L website)

Required: Excel software for analysis of lab data (available free to University of Calgary Students)

Students must arrange access to TopHat for homework assignments. TopHat is free for University of Calgary Students. Further details will be provided on the first day of class and on D2L.

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:**

No aids are allowed on tests or examinations other than ***non-programmable calculator***.

Students should also read the Calendar, [Section G](#), on Examinations.

#### 8. **Approved Mandatory And Optional Course Supplemental Fees:**

**Laboratory breakage fees and 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 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 (Thursday, December 9, 2021). 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 payment deadline, and 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:**

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 ([syasa@ucalgary.ca](mailto:syasa@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/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-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:**

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 Dr. Yuen-Ying Carpenter by email [yyscarpe@ucalgary.ca](mailto:yyscarpe@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- 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](#) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [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. Laboratory exemptions

Students 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. Students choosing to exempt from the lab should be aware that,

- any labs being conducted online may be significantly different from prior labs in this course;
- 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 will still be evaluated on other course components, including any tutorials.

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, particularly if these labs are not in the same format (online or in-person) this semester. 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.

Applications for lab exemptions must be emailed to the Undergraduate Science Center ([science.advising@ucalgary.ca](mailto:science.advising@ucalgary.ca)) no later than September 13th, 2020. Students who register in the course after this date should contact the USC as soon as possible.

#### Course Outcomes:

- Demonstrate an understanding of the principles and laws of thermodynamics and their applications to chemical and physical systems and their equilibria.
- Describe phase behaviour and changes of state for both pure and mixed systems, relate these to appropriate phase diagrams, and distinguish between real and ideal behaviour.
- Explain the roles of free energy and chemical potential in chemical reactions and physical changes.
- Strengthen problem-solving skills, particularly when applying the principles and concepts of physical chemistry to appropriate systems and conditions; analyze problems and work independently.
- Set up and perform physical chemical experiments, using standard instrumentation and employing all appropriate experimental and safety best practices; collect data through a computer interface (LabView).
- Analyze and interpret experimental data, evaluate and identify trends and anomalies, identify appropriate literatures sources and assess reliability of values, and generate appropriate conclusions from an experiment.
- Strengthen team-work and scientific communication skills, including the ability to communicate clearly and effectively with people, and respecting both yourself and others.

Electronically Approved - Sep 07 2021 15:26

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**Department Approval**

Electronically Approved - Sep 07 2021 16:04

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**Associate Dean's Approval**