



COURSE OUTLINE

1. **Course:** CHEM 599.29, Selected Topics in Chemistry - Fall 2021, Topic: Heterogeneous Catalysis

Lecture 02: TR 12:00 - 13:15 - Online

Instructor	Email	Phone	Office	Hours
Prof. Samira Siahrostami	samira.siahrostami@ucalgary.ca	403 338-3262	URC 2E-215	TBA

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.

Lectures **will** be recorded and will be provided to the students who miss the class.

PDF of the lectures will be posted in D2L.

Course Site:

D2L: CHEM 599.29 L02-(Fall 2021)-Selected Topics in Chemistry

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

Overview of Course Topics

1. Heterogeneous Catalysis and a Sustainable Future
2. The potential Energy Diagram
3. Surface Equilibria
4. Rate Constant and Kinetics
5. Energy Trends in Catalysis
6. Electronic Factor in Heterogeneous Catalysis
7. Catalyst structure: Nature of the Active Sites
8. Poisoning and Promotion of Catalysts
9. Surface Electrocatalysis
10. Machine Learning in Catalysis

Course Outcomes:

- Understanding the basic concepts in heterogeneous catalysis.
- Practice a systematic, first-principles approach to the science of surface reactivity.
- Describe the unification between heterogeneous catalysis and electrocatalysis.
- Articulate the importance of heterogeneous catalysis to solve our grand energy and environmental challenges.

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Consent of the Department. MAY BE REPEATED FOR CREDIT

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	Total number	Weighing%	Date
Assignments	4-6	20%	Every 2 to 3 lectures
Quizzes (synchronous, in-class)	2	10%	See D2L for dates
Mid-term seminar (Team activity)	1	20%	See D2L for dates
Midterm exam (Synchronous, during class)	1	20%	November 16, 2021
Final Project	1	30%	December 14, 2021 11:59 PM

There is no registrar-scheduled final exam in this course.

All Activities and Assignments are due at 11:59 PM via D2L on the dates in the calendar on D2L.

Team Activities will be completed during scheduled Zoom class times and those deadlines will be typically 11:59 PM via D2L on the day after the class.

Seminars are group activities in which each group (4-5 members) works on a given topic. All the members of the team should work together to develop a 20 minutes seminar presentation. All members will participate in the in-class presentation. The seminars are synchronous and occur during class time.

Quizzes are synchronous (all students write at the same time) and occur during class time. The duration is 15 minutes plus 5 minutes buffer time.

The midterm exam is open-book and synchronous (all students write at the same time) and occurs during class time. The duration is 50 minutes (for writing time) plus 25 minutes buffer time.

A final project will be assigned to each student based on the course contents. Two weeks timeline is given to complete the project.

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 the midterm or final exam must contact Dr. Siahrostami at least 7 days in advance of the scheduled assessment.

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	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

Your grade is determined by marks for both individual work and team-scored components.

Communication, both oral and written form, is important to this course, and the quality of your writing will factor into the evaluation of all assignments. Constructive critical analysis of peer work is also an essential course component.

Additional Academic Integrity Information: All work submitted for this class (whether as a draft version or for final grading) is held to the strictest standards for intellectual honesty. All team assignments are considered a team effort. When you put your name on a team submission, you are indicating that you are submitting your own work.

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):

Nørskov, Studt, Abild-Pedersen, Bligaard, *Fundamental Concepts in Heterogeneous Catalysis*. Wiley, 2014.

Recommended Textbook(s):

Chorkendorff, Niemantsverdriet, *Concepts of Modern Catalysis*. Wiley, 2017.

Your required handouts, videos, and readings for this course are available through postings on D2L. You will be responsible to look at electronic handouts in scheduled Zoom classes and keeping current with the reading material posted on D2L.

I recognize that we all will have the occasional glitches for aspects of online learning, but note that we are aiming to follow the following general guidelines.

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:**

Quizzes and the midterm exam are to be completed individually by students. The midterm exam is open-book.

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.

Communication, both oral and written form, is important to this course, and the quality of your writing will factor into the evaluation of all assignments. Constructive critical analysis of peer work is also an essential course component.

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 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 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 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. SU Faculty Rep., Phone: [403-220-3913](#) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: 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.

Electronically Approved - Sep 17 2021 09:14

Department Approval

Electronically Approved - Sep 20 2021 14:43

Associate Dean's Approval