

Chem 1027A (Fall 2022–23)

Chemistry: Everywhere and Everything

Prerequisite Requirements and Antirequisites

Chem 1027A does not have any prerequisites. The course is intended for students who have not taken Grade 11 or 12 Chemistry, and who are not registered in the Faculty of Science. Please note that Chem 1027A is not equivalent to Grade 12 Chemistry and cannot be used to fulfill prerequisite requirements for courses that require Grade 12 Chemistry.

Antirequisites: Chemistry 1301A/B, 1302A/B.

Course Website

News and course updates will be posted on Western's learning management system, OWL (<http://owl.uwo.ca>). This is the primary method by which information will be disseminated to all students in the class, so you are responsible for checking OWL on a frequent basis.

OWL will be used for the following:

- Course Outline
- Announcements
- Lecture Notes
- Accessing Grades
- Submitting Assignments

If you need technical assistance with OWL, seek support on the OWL Help page. Alternatively, contact the Western Technology Services Helpdesk by phone at 519-661-3800.

Learning Outcomes

The course has an emphasis on the development of skills such as critical thinking, problem solving, analysis, and quantitative reasoning; these “professional skills” are essential to success in not just chemistry but also in other courses and in many occupations. Any student receiving credit for Chem 1027A will be expected to demonstrate competence in their ability to:

Course-Specific Expectations	Soft-Skill Expectations
Describe the importance of chemistry in everyday life and the interdisciplinary nature	Work independently. Form productive and collaborative working

of chemistry.	relationships with other individuals.
Develop an appreciation for the complexity of chemistry.	Obtain, evaluate, and integrate information from various sources, and determine its relevance.
Use basic chemical terminology to describe chemical phenomena.	Prioritize tasks and manage the use of time.
Use critical thinking skills to explain, make connections between, and apply chemical principles, laws, and theories.	Communicate thoughts and ideas verbally and in writing.
Examine, integrate, and critically assess provided or collected information relevant to the field of chemistry.	Recognize when to seek assistance.
Recognize some of the modern ethical issues in chemistry and in science.	Develop respect for, and comply with, regulations and policies.
	Learn to accept responsibility for their decisions, actions, and non-actions.

Key Dates

Date	Event
Friday, September 9	First CHEM1027A class
Wednesday, September 28	NO CLASS – self study day
Friday, October 7	Midterm #1 (in class)
Monday, October 10	Thanksgiving; Western closed. NO CLASS
October 31 – November 6	Fall Reading Week. NO CLASS
Wednesday, November 9	Midterm #2 (in class)
Wednesday, November 30	Chemistry Connection Assignment Due
Thursday, December 8	Fall/ Winter Term classes end
December 10-22	Examination Period

Class and Instructor Information

Section	Time	Room	Instructor	Office	Email
001	Mon/Wed/Fri 12:30-1:30pm	NCB-293	Dr. Wilson Luo	NCB-225	wluo54@uwo.ca

To accommodate varying student schedules, weekly office hours will be held upon request and/or immediately after class on Fridays, as needed.

Email Policy:

- Please use your **@uwo.ca email address** and specify “**1027A**” in the subject line.
- In all emails you must include your **Western ID number**
- Every effort will be made to return emails within 3-5 business days. Responses may be delayed depending on the time of the semester (i.e. during the start of the semester, near the midterm, and towards the end of the semester).

Course Materials

There is no required textbook for the course. In addition to the lecture notes, any required resource will be posted to the OWL site for your reference.

Class Topics

The lecture component will introduce students to the fundamentals of chemistry and explore various relevant topics to make connections to the chemical world around us. The tentative topics below will be explored and may change slightly based on timing of material covered each week.

Topic	Description
	Chemistry Starter Pack
A	<ul style="list-style-type: none">• What is Chemistry?• Atoms: Protons, Neutrons, and Electrons• Periodic Table of Elements• Molecules, Ions, & Compounds• Organic vs Inorganic Chemistry• Bonds: Ionic vs Covalent• Typical Bonding in Organic Chemistry• Lewis Structures• Physical Properties vs Chemical Properties
	The War Against Plastics
B	<ul style="list-style-type: none">• What are Plastics?• Examples of Polymers Around Us• How are Polymers Synthesized?• Properties of Polymers• Thermosets vs Thermoplastics• How are Plastics Recycled?

-
- Biodegradable Plastics
-

What Is In Your COVID-19 Vaccine?

- Lipid Nanoparticles for mRNA Delivery
 - Colloids vs Emulsions
 - Polarity & Solubility
- C
- Lipids
 - Viruses & COVID-19 Entry Mechanism
 - mRNA
 - The Cell Factory
 - Protein Synthesis
-

Chemist's View Of An Iced Coffee

- Fats, Sugars, Caffeine, Water
 - Mixtures vs Pure Substances
 - Heterogenous vs Homogenous Mixtures
- D
- Phase Changes
 - Carbohydrates
 - Polysaccharides
 - Fats, Lipids, and Oils
-

What Makes Your Car Go?

- The Internal Combustion Engine
 - Fuel, Gasoline and Petrol
 - Hydrocarbons
 - Alkanes, Alkenes, and Alkynes
- E
- Structural Isomers
 - Combustion & Chemical Equations
 - Conservation of Mass
 - Balancing Equations
 - Endothermic vs Exothermic Reactions
 - Equilibrium – Reversible Reactions
 - Le Chatelier's Principle
-

Seeing In The Dark – Thermal Cameras

- Thermal Cameras
 - Electromagnetic Spectrum
- F
- IR vs Visible vs UV
 - Jablonski Diagram for Beginners
 - Fluorescence vs Phosphorescence vs Chemiluminescence
 - Greenhouse Gases and Climate Change
-

Identifying Fake News – The Scientific Process

G

- Scientific Facts & Methods
 - Finding Reliable Scientific Information
 - Peer-Review Process
 - Revisions and Retractions
 - Preprints
-

Evaluation

Components

Your grade out of 100 will be calculated as follows:

Component	Notes	Normal Value	MT#1 Missed	MT#2 Missed	MT#1+2 Missed
Reflection #1	Due: Sept 16, 2022	5	5	5	5
Reflection #2	Due: Dec 7, 2022	5	5	5	5
Chemistry Connection Assignment	Due: Nov 30, 2022	20	25	25	30
Midterm #1	Oct 7, 2022 (in-class)	15	–	20	–
Midterm #2	Nov 9, 2022 (in-class)	15	20	–	–
Final Exam	Cumulative, scheduled by the Registrar	40	45	45	60

Reflections

Students will submit two (2) reflections via OWL; one at the beginning of the course (September 16) and one at the end (December 7). Reflections should be 1-2 pages, doubled spaced at 12 point font, and address the following questions:

Reflection #1:

- What is your educational background and level of comfort with chemistry?
- What does chemistry mean to you?
- What do you hope to gain or learn from this course?
- Which chemistry topics excite you and why?
- Why do you think this course is named ‘Chemistry: Everywhere and Everything’?

Reflection #2:

- How does your understanding of chemistry, at the end of the course, compare to your first reflection?
- Based on the topics explored, describe the importance of chemistry in everyday life.
- Did your perspective and understanding of the world around us change after this course?
- You may have heard some people say, “I’m living a healthy lifestyle by staying chemical-free” (or something similar) – do you agree or disagree with this statement? Why?

Each reflection is worth 5% of your overall course grade, where half (2.5%) is graded by completion and the other half (2.5%) is graded by your ability to address the questions above. As there are no ‘right’ or ‘wrong’ responses, honest and thoughtful reflection is encouraged.

Chemistry Connection Assignment

Students will submit one (1) Chemistry Connection Assignment via OWL, due November 30. The purpose of this individual assignment will be for students to not only discover and research recent examples of chemical discoveries and news on their own, but to make connections between these and the course topics covered. Example topics will be provided on OWL, but students are encouraged to seek out a topic that interests them most.

In this assignment, students will be asked to:

- Identify and research a recent discovery or news article (within 3 years) that involves chemistry and/or chemical concepts.
- Describe the problem or challenge that the article is highlighting or attempting to address by providing sufficient context, background information, and citations (where needed).
- Make connections between the chosen topic and the course content, where possible.
- Provide a high-level summary of the chemistry involved, including explanations of relevant background chemical concepts.
- Describe the novelty or significance of the study or article.

Chemistry Connection assignments should be no more than 5 pages (including any images and references), doubled spaced at 12 point font, and will be graded on the criteria of Knowledge & Understanding, Application & Relevance, and Communication. A grading rubric will be uploaded on the OWL website.

Late submissions: Assignments and reflections submitted after the due date will be marked with a penalty of 20% of the maximum mark per day, unless you apply for academic consideration through the Dean's Office (see below) and receive an extension.

Midterms and Final Exam

The midterm tests will take place in-class on Oct 7, 2022 and Nov 9, 2022. Students will have 45 minutes to complete the test. The midterm exam is a closed-book assessment and will consist of multiple choice, true or false, matching and/or short answer questions.

The final exam is cumulative and will take place during the scheduled final examination period from December 10th – 21st, 2021. You will have 3 hours to complete the final exam. Your instructor will inform you of the exact date and time when the information becomes available.

Academic Policies and Legalities

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

The only calculator that is permitted on tests and exams is a non-programmable scientific calculator. No other electronic devices (phones, iPods, etc.) may be in your possession during tests and exams, even for timekeeping purposes. They may not be at your test/exam desk or in your pocket. Any student found in possession of these prohibited devices will receive a mark of zero on the test or exam.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Computer-marked, multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online synchronously or asynchronously. Details will be provided as needed. The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

The Midterm Test and Final Exam are in-person assessments. In the event that one or more of these assessments need to be conducted online due to COVID-19, they may be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: <https://remoteproctoring.uwo.ca>.

Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students with disabilities are encouraged to contact Accessible Education (http://academicsupport.uwo.ca/accessible_education/index.html), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The university's policy on Accommodation for Students with Disabilities can be found here: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

Learning-skills professionals at Learning Development & Success (<https://www.uwo.ca/sdc/learning>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at https://www.uwo.ca/health/student_support/survivor_support/get-help.html. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Religious Accommodation: When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the Academic Counselling unit or Dean's Office of their home faculty or affiliated college. Please consult University's list of recognized religious holidays (updated annually) at <https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>. The university's policy on Accommodation for Religious Holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Students who are in emotional/mental distress should refer to Health and Wellness (<https://www.uwo.ca/health>) for a list of options about how to obtain help.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital>.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.

Student Absences

Students who experience an extenuating circumstance (such as illness or injury) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic

consideration. In all cases, except where stated, requests must be made through the Academic Counselling unit or Dean's Office of your home faculty or affiliated college regardless of the circumstances or the value of the missed work.

- If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at 519-661-3040 or through the ticketing system on their website: <https://www.uwo.ca/sci/counselling/>

Students should note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences must be submitted to the Academic Counselling unit or Dean's Office of your home faculty or affiliated college.**

For more information, please consult Western's policy on academic consideration for absences: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

For the Student Medical Certificate (SMC), please see: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

If academic consideration has been granted for a missed Midterm Test, the weights of the Poster component and the Final Exam will be redistributed as per the evaluation scheme.

If academic consideration has been granted for a missed Final Exam, you will be able to write the Special Exam (the name given to a make-up Final Exam) in January of 2023. Two notes:

- If you miss the Special Exam, you will need to obtain academic consideration again. If it is granted, the date of the next Special Exam will normally be the scheduled date for the Final Exam the next time this course is offered. The maximum course load for the term in which the Special Exam is granted will be reduced accordingly. Please see the section on Special Exams in the Academic Calendar for details: https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#Page_65.
- If you are in a "Multiple Exam Situation" (more details at https://registrar.uwo.ca/academics/examinations/exam_conflicts.html), you may be eligible to write the Special Exam.