CHEM1101A - Summer 2026

Chemistry for Engineers

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

Course Instructor: Julia Mandato

How to address me: Julia or Prof. Mandato

Gender Pronouns: (she/her/hers)

Email: juliamandato@cunet.carlerton.ca

Note: If you have or question or would like to talk with me, you can send an email, visit me during student hours (see below), or approach me after lecture. I am happy to chat!

Student Hours: Wednesdays 3:00-4:30pm in SC 115

Class Location: Please check Carleton Central.

Class Times: Mondays and Wednesdays, 11:35am-2:25pm

Prerequisites: Ontario 4U/M in Chemistry or equivalent

Preclusions: additional credit for CHEM 1000 (no longer offered), CHEM 1001, CHEM 1005 (no longer offered), CHEM 1011

Department/Unit: Faculty of Chemistry

In this course, all students are welcome, including all races, colours, cultures, ethnicities, genders, and sexualities. This course is a space for respect for each other, including students, teaching assistants, staff, and professors. I am happy to work with students to implement approved academic accommodations. I am committed to fostering a supportive learning environment for all students. It is my hope that our class will support a diversity of experiences, thoughts, and perspectives. If you have any questions, concerns, or suggestions, please feel free to contact me. I am excited to work with you all and deliver an engaging, informative, and fun semester of chemistry!

Course Information and Materials

Course Description:

In CHEM 1101, you will learn fundamental concepts in chemistry, including: atomic and molecular theory, phases of matter, mixtures and solutions, stoichiometry, thermodynamics, and chemical equilibrium. Throughout the course, you will learn examples to connect these fundamental chemistry concepts with broader contexts (e.g., global challenges). In addition, you will learn and practice transferable skills such as reporting scientific values, problem-solving, and scientific argumentation that are beneficial to all science disciplines.

Course Textbook:

Students are not required to purchase textbooks or other learning materials for this course.
If you would like to purchase a reference textbook, the course is structured around Olmsted, John A., Williams, Gregory M., Burk, Robert C. (2020). *Chemistry 4th edition.*
This textbook is available at the Carleton University bookstore. The textbook is available in print or electronically (at a reduced cost). You are not required to purchase this textbook, but it is the recommended text if you would like extra practice problems for this course. I will not be assigning practice material from the text or suggested readings.

Technology Checklist:

To access Brightspace content, you will need:

- ✓ An internet-enabled computer (laptop/desktop)
- ✓ Access to reliable internet

Note: If you do not have access to some or all of these resources, there are several options to consider. (1) You can apply for financial aid, (2) there are some inexpensive options for purchasing technology (Best Buy refurbished products, Kijiji), & (3) single workspaces are available for student use on campus. Every student has free access to Zoom and internet access on campus using your MyCarleton1 credentials.

Course Format:

Each topic of the course includes the following resources:

- Lecture slides, presented during in person classes

To improve equity in the course, classes will be recorded through Zoom and automatically uploaded to Brightspace with closed captioning. Zoom recordings for lectures will be posted to the "Class recordings-Zoom" tab in Brightspace. Please keep the class recordings private.

Please note that the **recordings are only a partial substitute for the learning that occurs in class**, so it is in your best interest to make every effort to attend class, to avoid procrastination and falling behind in the course.

- An annotated copy of lecture slides (will be posted after class, including examples and extra notes from in-person classes)
- Assignments, in the form of an unlimited attempt Brightspace quiz
- Topic quizzes, in the form of a timed, two-attempt Brightspace quiz
- Additional Practice problems, optional worksheets for extra practice and studying

All the details and information for the course are located on **Brightspace**. I send announcements with key information. Please check it regularly. The specific learning outcomes for this course located below.

Topics Covered and Learning Outcomes

Learning outcomes describe the knowledge, skills, and values that you as the learner should be able to demonstrate by the end of the learning period, in this case, by the end of each module or the course. The course is designed so that each learning outcome has associated instruction (e.g., videos, text, or class time), practice opportunities (e.g., class questions, practice problems), and assessment (e.g., assignments, midterm, final exam). Please feel free to ask questions anytime!

Overarching Learning Outcomes:

- Apply core chemical concepts and processes to solving complex problems in the real world
- Describe macroscopic properties of chemical substances and explain how atomic or molecular behaviour accounts for those properties, including in everyday situations.
- Appreciate the interdisciplinary nature of chemistry and relate chemical concepts to problems in other disciplines
- Construct scientific arguments in chemistry, using evidence and causal reasoning to support a claim—these arguments relate to any question where you are asked to explain "why" or to "justify" your response
- Use inclusive language and behaviour in all aspects of the course, including classes and assessments (to be self-assessed)

Module	Topics
1: Math and Measurement	1. Math and Measurement
2. Stoichiometry	2. Stoichiometry
3. Atomic Structures and Properties	3. Atoms and Light 4. Electron Configurations 5. Periodic Trends
4. Molecular Structure and Properties	6. Nomenclature 7. Lewis Structures 8. VSEPR 9. Hybridization and MO Theory 10. Band Theory
5. Phases of Matter	11. Solids 12. Ideal and Non-Ideal Gases 13. Liquids 14. Phase Changes 15. Solutions
6. Thermodynamics	16. Standard State Thermodynamics 17. Non-Standard State Thermodynamics

For a detailed list of learning outcomes, please see the **Content Checklist** document on Brightspace.

Assessments and Key Course Details

Research about learning strongly suggests that the most important factor in learning is doing the work of reading, writing, recalling, practicing, synthesizing, and analyzing. Learning happens best when people actively engage material on a consistent basis, and that is why we have high standards in this course. We are confident that, with appropriate effort, you **all** can meet those standards.

We also make an effort to reduce unintentional bias in grading by using methods such as grading assignments one question at a time (i.e., grading all of question 1 before grading any of question 2), grading anonymously, and using rubrics.

Grade Breakdown:

The passing grade for CHEM1101 is 50%. You must pass the laboratory component of the course to pass CHEM1101. **You must also score 40% or more on the final exam**, regardless of your score in the course. Your grade will be calculated individually to give you the **best possible final grade** based on the following three options:

	OPTION 1	OPTION 2	OPTION 3
LABORATORY*	25%	25%	25%
ASSIGNMENTS (6)	10%	10%	10%
QUIZZES (6)	15%	15%	15%
MIDTERM	20%	10%	-
FINAL EXAM	30%	40%	50%
BONUS PARTICIPATION	+ 3%	+ 3%	+ 3%

Academic integrity is of paramount importance in this course. There is more information further down in the syllabus. Be sure to check the specific academic integrity instructions for each assessment.

Course Components:

Details of all course components are listed below, but in summary, CHEM1101 consists of the following components:

Course Component	Details – See specific details below	Important Dates – See specific deadlines in Weekly Schedule
Laboratory	Operates separately from course	See your lab schedule!
Assignments (6)	Completed weekly on Brightspace	Due on Sundays at 11:59pm
Topic Quizzes (6)	Completed weekly on Brightspace	Due on Sundays at 11:59pm
Midterm Exam	Closed-Book test held in Class	In Class on **Monday June 1st**
Final Exam	Closed-book test held during exam week	Date TBD by the University

*Laboratory:

The laboratory part of this course is mandatory for all students.

The lab portion of this course is worth 25% of your final CHEM 1101 grade but it is administered separately from the lectures. **To pass CHEM 1101, you MUST complete all the lab requirements.** There

is a **separate Brightspace page for the lab** that includes instructions, expectations and information on how labs will be evaluated.

If you have questions or problems with the lab scheduling, etc., please contact the lab coordinator: Mastaneh Azad (mastanehazad@cunet.carleton.ca)

Assignments:

There are 6 Assignments throughout the semester. Assignments will be completed on Brightspace, and will count for 10% of your grade, and will be **due on Sundays at 11:59 pm ET throughout the term**. **We understand situations happen, therefore, to accommodate for these situations, your lowest-scored assignment will be dropped. Outside of this, no accommodations will be made for missed assignments.**

Questions will be similar to the provided practice problems and textbook questions and will be great practice for the topic quizzes, midterms and the final exam. You will receive your grade after submission. Assignments are not timed and you will be allowed to enter and exit the assignments as many times as you like before the due date/time. However, you need to make sure you submit the assignment before or by the due date to receive any marks.

All assessment deadlines can be found in the Weekly Schedule on Brightspace. It is the student's responsibility to ensure assignments are submitted on time.

Topic Quizzes:

There are 6 Topic Quizzes throughout the semester. Topic Quizzes will be completed on Brightspace, will count for 15% of your grade, and will be **due on Sundays at 11:59 pm ET throughout the term**. **We understand situations happen, therefore, to accommodate for these situations, your lowest-scored Topic Quiz will be dropped. Outside of this, no accommodations will be made for missed assignments.**

Please be sure to review the details of the quiz to see the academic integrity instructions, number of attempts allowed, and other details. Quizzes are timed, and you will have 2 attempts to complete each quiz. You will receive your quiz grade after submission and answers will appear after the deadline.

These are open book/open notes but must be **your own work**.

All assessment deadlines can be found in the Weekly Schedule on Brightspace. It is the student's responsibility to ensure assignments are submitted on time.

	Assignment	**Topic Quiz**
Where can I complete this?	Brightspace quiz	Brightspace quiz
Is there a time limit?	No, Unlimited time	Yes, timed
How many attempts do I get?	Unlimited	2 Attempts
Can I open and work on it one question at a time?	Yes	No
Is it graded?	Yes	Yes
Is it open note/open book?	Yes	Yes
Can I work with my peers, use AI, or google the answers?	**No – See details about academic integrity**	**No – See details about academic integrity**

Midterm:

The midterm will reflect the intended learning outcomes to date and all aspects of the course (e.g., assignments, topic quizzes, practice problems, lecture notes). It will cover Topics 1-10, about half of the course.

The midterm will be handwritten on paper during class time on **Monday June 1st.** It will be closed-book, closed-notes format however, a periodic table, formulas and constants will be provided as needed. You will need a calculator - programmable and/or graphing is acceptable, but cell phones or any other device with transmit/receive capabilities are not acceptable.

The midterm answers and grades will be returned to you – typically one to two weeks after they are written. I encourage you to check what you did right and wrong to prepare you for the final exam.

Final Exam:

The final exam is mandatory - **you must write it and obtain a mark of 40% or higher to pass the course.** If you earn a lower mark than this on the final exam, your overall grade will be an F, **regardless of what your numerical marks add up to.**

The final exam is cumulative to the entire term. The exam format will be similar to the midterm.

The exam will take place in person, with the time, date and location set by university examination services. The exam period is listed in the university calendar. You must be available to write the exam on campus at any time during that period.

If you miss the exam for any reason, you'll have to apply to the University Registrar's Office to request a deferred exam.

Bonus Participation:

Being an active participant in your learning has been shown to have many benefits such as improved course grades (and decreased course failures), increased retention and transfer of new information, increased motivation, and improved critical thinking skills. You will activity participate (synchronously) in class through problem-solving, asking and answering questions, and having discussions with your peers to count towards 5% of your overall grade. This will be in the form of Wooclap questions and in class activities. **You do not need to study or prepare for this participation, simply show up to class!**

Submissions are marked for completion, not correctness. **You need to participate in 80% of classes (10 of our 13 classes) to receive the full participation mark;** there's no need to tell me if/why you miss a class. Participation is optional in the first class. I recommend that you participate to test out the tools and identify any technical issues.

Late and Missed Work Policies:

Late coursework (Assignments and Topic Quizzes) will not be accepted.

Why am I not accepting late work? CHEM1101 is a compressed, 6-week course. It is important students stay up to date with assessments as the pace moves very quickly. All assessments are available for an extended period of time, and as described above, to accommodate for situations outside of student's control, your lowest-scored assignment and quiz will be dropped.

Deferred/missed term work for short-term accommodation (5 days or less): If you require accommodations for this course in a 5 days or less period, please email me to discuss potential options

for accommodations which may involve reweighing assessments in the course breakdown or potential deferred midterms.

Deferred/missed term work for longer term incapacitation (5 days or longer): If you require accommodations for this course that are longer than the 5-day (short-term) period, please email me to discuss how/whether accommodation needs could be met for this course in accordance with the policy listed here. You will need to go to the Registrar's office for support, but it is important that the instructor is apprised of the long-term accommodation needs. If you need to defer your final exam, please complete the form here.

Re-correction Requests:
If there is an error in the correction of an assessment in the course (e.g., midterm), you may request a re-correction. Requests for re-correction of midterms must be submitted by filling out a form on Brightspace, no later than 10 working days from the first day marked work is available for review. Submissions after the deadline will not be considered. The new score could be lower, the same, or higher than your original score.

Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (students.carleton.ca/course-outline)

Statement on Chat GPT/Generative Artificial Intelligence (AI) usage:

AI Use in this course: Students may use AI tools under the following guidelines:

✓ Approved uses of AI tools	× Unapproved use of AI tools
- Grammar and spell checking (e.g., Grammarly, Microsoft Word Editor) - Basic formatting and design suggestions (e.g., Microsoft Word's formatting tools, PowerPoint Design editor)	- Writing assignments - Answering the Assignments and Topic Quizzes - Answering mathematical problems (ChatGPT is a language model, not a calculator. It can easily fumble simple algebra, or be "persuaded" to give inaccurate answers.) **Alternatives**: If you need help with unit conversions, I recommend using **WolframAlpha** it is a far better tool for scientists and engineers.

Documenting AI Use: It is not necessary to document the use of AI for the permitted purposes listed above. As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance **not** described here with the course instructor to ensure it supports the learning goals for the course.

Why have I adopted this policy? This policy ensures that student voices and ideas are prioritized and authentically represented, maintaining the integrity of the work produced by students while allowing basic support to enhance clarity, correctness, layout, and flow of ideas. The goal of adopting a limited use of AI is to help students develop foundational skills in writing and critical thinking by practicing substantive content creation without the support of AI.

Statement on Academic Integrity:

Students are expected to uphold the values of academic integrity, which include fairness, honesty, trust, and responsibility.

Examples of actions that **do not** adhere to Carleton's Academic Integrity Policy include:

- Plagiarism
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignment and exams
- Using artificial intelligence tools such as ChatGPT when your assessment instructions say that it is not permitted

Please review the checklist linked here to ensure you understand your responsibilities as a student with respect to academic integrity and this course.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here.

Additional details about this process can be found on the Faculty of Science Academic Integrity website.

Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.

Student Rights & Responsibilities:

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Online Community Expectations for Social Platforms:

Online communities can be highly beneficial to students and can help to facilitate learning within the course. I encourage people to ask questions, learn from one another, and have open discussions about class material on the Brightspace Discussion Board. That said, any acts of academic misconduct (i.e., cheating) will not be tolerated and will result in serious consequences ranging from a grade reduction to expulsion (*see* academic integrity violations).

Examples of **appropriate** peer-to-peer sharing/learning vary from course to course. In this course appropriate peer-to-peer sharing includes:

- identifying the proper formula to use
- identifying an incorrect or missing step in a person's work
- brainstorming potential reasons behind a concept
- suggesting helpful sites and videos for learning a concept
- Posting your own work showing only a specific step or process for illustrative purposes (note: this is very different from posting your work and solution for others to simply copy)

Examples of **unacceptable** peer-to-peer sharing includes

- Posting or sharing the answers to quiz or assignment questions
- Indicating which answers are correct on assignments

- Sharing links to solutions
- Posting your own complete work for a question/solution

General Rules & Guidelines

- *No bullying or harassment (towards other students, or teaching assistants)*
- *No encouraging harassment*
- *No personal attacks*
- *No racism, sexism, homophobia or hate speech of any kind*

There may be specific situations not covered by these rules, and there may also be certain cases where a rule does not apply. If you are concerned, confused, or conflicted over something, please reach out to a TA or me through email for help. Let's do our best to support one another in this class and keep the online experience a safe, inclusive, and positive experience for everyone.

Student Concerns

Communication:

Feel free to ask questions about the course concepts, course structure, our career paths, other career options, succeeding in the course, university resources *etc.* **Please allow 2 business days** for a response before emailing me a second time!

If a concern arises regarding this course, **your first point of contact is me.** If I am unable to address your concern, the next points of contact are (in this order):

Note: You can also bring your concerns to Ombuds services.

Student Resources:

Service	Can help with…	Contact Information
Centre for Student Academic Support (CSAS)	Learning support workshops for success in academic writing, study skills, time management and more	613-520-3822 4th Floor MacOdrum Library https://carleton.ca/csas/learning-support/
Science Student Success Centre (SSSC)	Academic support, career connections, community building, health care preparation, science faculty refresher courses, mentoring and research resources.	(613) 520-2600 ext. 3111 3431 Herzberg Laboratories https://sssc.carleton.ca/
Engineering Academic Support	Program requirements, registration and learning support.	613-520-5790 3010 Minto Centre https://carleton.ca/engineering-design/currentstudents/undergrad-academic-support/
Paul Menton Centre (PMC)	Learning disabilities, accommodations and tools.	613-520-6608 501 University Centre www.carleton.ca/pmc
International Student Services Office (ISSO)	International students' needs such as English help, adjustment resources, etc.	613-520-6600 128 University Centre www.carleton.ca/isso
Research help at MacOdrum Library	Library and research help, citation management, account and connection support.	Texting: 613-505-4245 Online chat: https://library.carleton.ca/help Email: askthelibrary@carleton.ca https://library.carleton.ca/services/research-help
Health and Counselling Services	Physical and mental health issues and stress.	613-520-6674 2600 Carleton Technology & Training Centre https://carleton.ca/health/
Departmental Advising	Program specific academic advising	https://carleton.ca/academicadvising/departmental-advisors/

Career Services: https://carleton.ca/career/
Writing Services: https://carleton.ca/csas/support/
Peer Assisted Study Sessions (PASS): https://carleton.ca/csas/group-support/pass/
Math Tutorial Centre: https://carleton.ca/math/math-tutorial-centre/

Carleton offers an array of mental health and well-being resources, which can be found here.

University Policies

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B+ = 77-79	C+ = 67-69	D+ = 57-59	F = <50
A = 85-89	B = 73-76	C = 63-66	D = 53-56	WDN = Withdraw from the course
A- = 80-84	B- = 70-72	C- = 60-62	D- = 50-52	DEF = Deferred

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