

CHEM 1053: Chemistry and Our World



Course Description

Format: Asynchronous Online

From the Academic Calendar: "This course provides an insight into the roles chemicals play in our everyday world. We will look at the chemistry that underlies issues with toxins, food and nutrition, air and water pollution, climate change, drugs, plastics and agrichemicals. No prior experience in chemistry is necessary for this course. No prerequisites or corequisites."

This course is very much designed to be approachable for everyone at Acadia, regardless of your experience in chemistry or other science courses.

Instructor Information



Instructor: Dr. Matt Lukeman.

I prefer he/him pronouns. I was educated at St. Francis Xavier University (BSc Chemistry, 1999) and University of Victoria (Ph.D. Organic Chemistry and Photochemistry, 2003), and have been teaching a variety of chemistry and biotechnology courses at Acadia since 2005. I have an active research group that looks at photochemistry of organic compounds and have done some work around water quality.

Email address: mlukeman@acadiau.ca

Phone: (902) 670 9849. You can text this number, although I would prefer you contact me by email unless urgent.

Office Location: Elliott 114, which is in the basement. There is an elevator from the main level that can take you down, or a set of stairs. I am available for virtual meetings by request.

Course Overview

Communication

This course is designed for you to proceed at your own pace. I won't be sending reminders. If you want to reach me with any questions or comments, the best ways are to either meet me in person or via a virtual meeting. Just send me an email! (I try to answer emails within 24h.) Feel free to email at any time for anything that is unclear after checking the syllabus or information on Moodle.

Course Format

The course consists of 9 units. They are designed to be completed sequentially, with later units building on material covered in earlier units. Each unit is contained in a "lesson", with each lesson containing four pages:

- Page 1 – Unit overview and unit-level learning objectives.
- Page 2 – Video lectures. Each unit is broken up into somewhere between 3 and 8 videos, all around 5 – 15 min in length. Powerpoint files are available in a folder at the top of the main Moodle page. Each video has embedded questions to test your comprehension that must be completed to continue through the video.
- Page 3 – Quiz/Assignment and Resources. This links to the End of Unit Quiz and Assignment that are also accessible separately on the main page. Resources point to links and sources of information that you might find helpful, but is not required reading.
- Page 4 – Key Concepts. This is a summary of many of the most important points from the unit, condensed into a compact list. While I tried to be comprehensive, I cannot guarantee that every important point has been captured here.

Each unit also has an "End of Unit" quiz that should be completed shortly after completing the videos. Each quiz features 10-20 multiple choice questions that draws on the material from the unit. Once you start the quiz, you have 30 minutes to complete it. Don't start the quiz and then go away to do something else! You get one attempt per question.

Each unit also will have a short assignment that will in some way require you to reflect on the material covered in that unit. These will be assessed based on your ability to apply the course material to real life and communicate it. Many of these assignments will be submitted as videos. In such cases, you can either record the videos and upload them, or use the "record" function in Moodle. It should be obvious how to do it once you click on the assignment.

At the end of the course there will be a final exam which will be written in-person at a time scheduled between you and your instructor. If you are not nearby, it may be possible to write in person elsewhere with a proctor.

Course Learning Outcomes

By the end of this course, students will be able to

1. Critically evaluate claims in media and find credible information about chemicals.
2. Distinguish between acute and chronic toxicity, and find and understand chemical toxicity data.
3. Distinguish between legitimate scientific claims and pseudoscience.
4. Articulate major ideas that are central to the field of chemistry and how they developed over time.
5. Articulate how the periodic table was developed and how it is an organizing principle in chemistry.
6. Identify the primary air pollutants regulated by Environment Canada, how they form, and how they might be mitigated.
7. Articulate how ozone and CFCs interact to protect from UV radiation.
8. Articulate what chemicals are driving climate change and why they are responsible.
9. Articulate the main methods of water purification.
10. Articulate the main chemical processes relevant to cannabis use, and the risks.
11. Identify important plastics and identify the main environmental issues associated with them.
12. Identify important pesticides and the main environmental issues associated with them.
13. Identify important food chemicals and how they are related to sensory and health effects.
14. Communicate scientific information in written and spoken (video) formats.
15. Demonstrate at a basic level important chemical concepts as they relate to the outcomes listed above.

Course Materials

There is no required text or materials for this course. Most of what you will need for the course will be provided to you for free on Moodle, or will be freely available on the internet. The library has an impressive chemistry collection that you might find useful for the course.

Technology Use

You will need access to the internet (Moodle), email, and MS Word. For video-based assignments, you will need a device capable of recording video, such as a smartphone or laptop.

Artificial Intelligence (AI) tools are developing rapidly and are becoming increasingly sophisticated. There are many great uses for AI tools in this course, which could include things like advanced literature searching, summarizing material, creating practice tests, etc. For submitted work, however, it is expected that you do not use AI to generate anything that you are submitting. If AI use is suspected in your submitted

work, you might be asked to show evidence that the work was done “by hand” (such as submission of the Word doc with version history metadata). Improper use of AI will be considered a violation of Academic Integrity (detailed below).

Course Schedule

You have 6 months to complete the course. I recommend that you pace yourself appropriately and do not leave everything for the final few weeks. Below is a suggested 9-week schedule, although you are free to set a schedule that works best for your life.

Week	Date*	Topic
1	Week 1	Chemophobia
2	Week 2	Toxicity
2	Week 3	History of Chemistry
3	Week 4	Air Pollution
3	Week 5	Ozone
4	Week 6	Global Warming
4	Week 7	Water
5	Week 8	Plastics
5	Week 9	Pesticides

Assessment

Assessment	Percentage of Final Grade
End of Unit Quizzes (average of best 8)	25%
Unit Assignments (5% each)	45%
Final Exam	30%

Description

End of Unit Quizzes

Described above. There are a total of 9 quizzes. I will drop the worst one, and the average of the remaining 8 will be used to calculate your grade. These quizzes will be graded automatically.

Assignments

Also described above. These must be graded by me “by hand”. You do not have to wait for feedback before moving on to the next unit.

Final Exam

Contact me when you are done or nearly done the course material and arrange for a date and time to write the final exam in person on paper. The exam will be multiple choice (100 questions) and cover all units. Question difficulty will be similar to the End of Unit Quizzes.

Grading System

For more information about Examinations and Grades, see the [Registrar’s website](#).

Numeric Value	Letter Grade	Grade Point Value
90-100	A+	4.33
85-89	A	4.00
80-84	A-	3.67
77-79	B+	3.33
73-76	B	3.00
70-72	B-	2.67
67-69	C+	2.33
63-66	C	2.00

Numeric Value	Letter Grade	Grade Point Value
60-62	C-	1.67
57-59	D+	1.33
53-56	D	1.00
50-52	D-	0.67
<50	F	0.00
	W	Withdraw

Policies and Procedures

Academic Integrity and Use of Artificial Intelligence

It is expected that in this course you do and submit your own work.

Submitting someone else's work as if it was your own is a violation of academic integrity and will be dealt with according to the academic integrity procedure outlined in the [Academic Calendar](#). For submitted work that cites work done by others, such as information in journal articles, you must cite the original author and provide a reference or a link to the sources. I am not strict on citation/referencing style - use whatever style you are most comfortable with. In chemistry, it is normal to use superscript numbers in the text, with a corresponding list of references at the end (this is how wikipedia does it).

Artificial Intelligence is a powerful tool that can assist and support your learning in this course. However, there are appropriate and inappropriate ways to use it.

Appropriate Uses

- You can ask AI to give an expanded explanation or more examples of concepts in the course.
- AI can generate sample tests for you based on the course material (based on the key concepts at the end of each unit).
- You can ask AI to critically evaluate your work before you submit for things like language/grammar, correctness of facts, or gaps in logic.
- Use AI to brainstorm ideas, questions, or possible approaches to a topic.
- Ask AI to provide examples or analogies that help you understand a concept.
- Use AI to identify gaps in your understanding or suggest topics you should review.
- Use AI to check your understanding by asking it to critique your explanation of a concept.
- Use AI to help organize your thoughts or develop an outline before completing an assignment.
- Use AI to help locate useful search terms or potential sources, while verifying information using reliable academic sources.
- Critically evaluate AI-generated information, since AI can produce inaccurate, incomplete, biased, or fabricated information.

Inappropriate Uses

- Copy/paste quiz questions directly into AI chatbots.
- Submit AI-generated text, answers, or other work as your own on any submitted assignment.
- Use AI to paraphrase or rewrite someone else's work in an attempt to conceal plagiarism.
- Use AI to generate citations or references without checking that they actually exist and support the claims being made.
- Use fabricated, AI-generated, or unverifiable sources in submitted work.
- Rely on AI output without checking its accuracy, reasoning, sources, and assumptions.
- Represent AI-generated work as evidence of your own learning or understanding.

Remember that you are in this course to learn something! I expect you to learn enough basics about chemistry to better understand the world around you, and learn about specific ways chemistry applies to the real world. This is an opportunity for you to deepen your knowledge and strengthen your critical thinking skills. Skipping the hard part and letting AI carry the load will prevent you from growing.

Other Policies and Procedures

Policies specific to online, continuous-intake courses are outlined in the [Online Student Handbook](#). For comprehensive information on Acadia University's policies and procedures, please refer to the current [Academic Calendar](#).

It is expected that each student who registers in an online course at Acadia University will be familiar with the contents of the Online Student Handbook and the Academic Calendar.

Useful Links

- [Policy Regarding Support and Accommodation for Students with Disabilities](#)
- [Acadia University Academic Integrity Policy](#)
- [Acceptable use of Technology](#)
- [Acadia Academic Calendars](#)

Support Resources

There are many student supports for you at Acadia, including Accessible Learning Services, the Writing Centre, the Indigenous Gathering Space and Resource Centre, the Women's Centre, the Equity Office, the Black Student Employment and Cultural Navigator, Spiritual Wellness, services regarding 2SLGBTQI+, and mental health support services. The most up to date [list of Student Support Resources](#) is found on our website.

If you need academic accommodations or other accessibility support, Acadia's [Accessible Learning Services](#) is here to help. Accessible Learning Services works with students to identify their needs and arrange accommodations that support their learning. If you think you may benefit from accommodations, we encourage you to connect with Acadia Learning Services as early as possible, ideally before the term begins. You can find information about services and how to register on the [Accessible Learning Services](#) website.

Useful Links

- Library: [Vaughan Memorial Library](#)
- Writing support: [Acadia Writing Centre](#)
- Tutoring: [Acadia Tutoring Services](#)
- Accessible Learning: [Accessible Learning Services](#)
- Technical support: [Technology Services Service Desk](#)
- Moodle help: [Moodle Help](#)