Western Science

Department of Chemistry

Chemistry 2210A Chemistry of the Environment
Course Outline

1. Course Information

Course name: Chemistry of the Environment (2210A)
Academic term: Fall (September 2024 – December 2024)
Class time: [redacted]
Location: [redacted]

List of Prerequisites
Prerequisites: (Chemistry 1301A/B and Chemistry 1302A/B) or (Chemistry 1301A/B and Integrated Science 1001X).
Antirequisites: CEE 2217A/B; Chemistry 4491E.
Cannot be taken at the same time as Chemistry 4491E

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

[redacted]
Email: [redacted]
Office: [redacted]
Office Hours: By appointment (in-person or Zoom) scheduled via Email.

Email is the best way to contact me (your instructor). Although I will often reply within one day, please allow up to 48 hours. Please include your name in your email.

3. Course Syllabus, Schedule, Delivery Mode

Course Description

Explore the current and future impact of human activity on our environment from a chemical perspective. Analyze the chemistry behind topics such as the ozone hole, air pollution, climate change, fossil fuel and alternative energy, chemistry of natural and contaminated water and water purification.

Learning Outcomes

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

- Describe the impact of human activity on our environment, especially with respect to the ozone hole, air quality, climate change, and water quality.
- Summarize key chemistry processes, the ones that happen naturally as well as the ones that occur as a consequence of anthropogenic activities, that impact the environment.
- Analyze current news articles related to environmental chemistry issues.
- Describe how ozone is created and destroyed in the natural, unpolluted atmosphere. Demonstrate how man-made chemicals interfere with natural processes to create ozone 'holes' and the impact of these on all living species. (Theme 1)
- Identify the root causes and consequences of polluted air. (Theme 2)
- Explain the natural greenhouse effect and how the planet's temperature is maintained in equilibrium. Identify the impact of human industrial activity and the contribution of carbon dioxide to global warming. Distinguish between conventional energy sources and alternative (renewable) energy sources. Gain a general understanding of several representative alternative energy sources. (Theme 3)
- Describe the distribution of dissolved species in the natural aquatic system. Understand how chemical properties of water are impacted by dissolved gases, organic matter, and metal ions in water. Understand standard protocols of water purification for human consumption. (Theme 4)

Anticipated Course Content (subject to revision[#])

Themes and anticipated weekly progress	**Textbook***		**Description**
	Baird & Cann	**VanLoon**	
Atmosphere Week 1-3	1	2	Atmosphere composition, photochemical reactions in the stratosphere
	2	3	The Ozone Holes
Ground Air Week 3-6	3	4	Smog
	4	5	Acid Rain
	3	6	Aerosol
Climate Week 6-8	5	8	The Greenhouse Effect
	6	8	Fossil fuels
	7	-	Biofuels
	8	-	Other alternative energies (hydrogen and nuclear)
Water Week 9-11	10	9	Basic water chemistry
	10,12	10-13	Dissolved species in water (gases, organics,metals)
	11	16	Water Purification Strategies

#Although the themes listed above are the *intended* course content, the instructor reserves the right to deviate from this list should an interesting topic of environmental concern appear in the news.

*See next section for course materials. Content appears in the lectures are testable. If it is not covered in class, it is not testable.

Key Sessional Dates

Classes begin: September 6, 2024
Fall Reading Week: October 12 – 20
Classes end: December 6, 2024
Exam period: December 9 – 22, 2024

4. Course Materials

Textbook

There is no required textbook for this course.

Suggested textbooks:

The content covered in this course is heavily based on the following two textbooks, which are available (hard copy and digital copy) at the Western Bookstore:

- Environmental Chemistry, 5th Edition, by Baird and Cann, Freeman and Company
- Environmental Chemistry, A Global Perspective, 4th Edition, by vanLoon and Duffy, Oxford University Press

Lecture notes

- Powerpoint slides used for lectures will be shared with students prior to each class, through OWL Brightspace.
- Reading materials and other learning resources will be posted on OWL Brightspace.

All course material will be posted to OWL: https://westernu.brightspace.com/

Students are responsible for checking the course OWL site (https://westernu.brightspace.com/) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the OWL Brightspace Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements

Computer with internet connection and working microphone is required to successfully complete the "Chemistry in the News" VoiceThread Discussion activity.
Assignments are submitted electronically to OWL Brightspcae. You could either type your answers in the provided document template and save it as a PDF file, or you could write your answers by hand,

and convert the paper document to an electronic file. In the latter case, a scanner or camera is required for the file conversion.

5. Methods of Evaluation

Your course grade, out of 100, will be calculated as listed below. In order to pass the course, you must achieve a total course grade of 50% or greater, AND receive a grade of 40% or greater on the final exam.
If your final exam grade is less than 40%, your total course grade will be recorded as 45 (regardless of marks received for other evaluated items), or your calculated course grade (all evaluated items added), whichever is lower.

Grading Scheme and Assessment Dates:

Component	Date	Weight
Chemistry in the News VoiceThread Discussion	Throughout the term Reflection assignment due **Friday, November 29, 2024**	20%
Weekly Quick Quizzes	Throughout the semester Published every Monday (except reading week), submission due Friday of the week	8%
Assignment	At the end of each theme (total of 4)	12%
Mid-term Test	October 25 (makeup test: Nov 2)	25%
Final Exam	Scheduled by the Registrar	35%

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:
https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Final Exam
- Midterm Test

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Detailed description on each evaluation category is listed below (including evaluation scheme for missed assessments):

- **Chemistry in the News VoiceThread Discussion (20%)**

The purpose of this assignment is to have you discover and then analyze current environmental chemistry issues in the world around us by discussing current news articles with your peers. This assignment consists of:

- **Creating and Posting** a VoiceThread about a current news article with your comment
  A posting schedule will be announced before the activity starts. Each student shall post their VTs no later than the listed date. Late penalty will be applied as a 10% mark deduction of the posting component per day. Posting made after the reply cut-off date (**Nov 10, 11:55 pm**) will not be accepted.
- **Replying** to classmates' posts. You shall make constructive feedback to a minimum of Five different VTs published within your VT group. Upload your feedback any time between September 23 and November 10. Reply made later than the cut-off date (**Nov 10, 11:55 pm**) will not be accepted.
- **Engaging** in small group discussions to gain deeper understanding of the subject. You will reach out to the members of your VT group to schedule a discussion. This discussion is a preparation for the reflection report. It can be done at a time mutually agreed upon by the members of your discussion group. One class time will be set aside for this activity.
- **Synthesizing** your discussion experience by responding to reflection questions. You will combine a reflection report (detailed instructions will be provided), and submit it to OWL Brightspace. The submission deadline is **November 29, 11:55 pm**.

A No-Late-Penalty Period applies ONLY to the report submission. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their reflection report up to 48 hours past the deadline without a late penalty. Should students submit their assessment beyond 48 hours past the deadline, a late penalty of 10% per day will be applied. Submission of reflection report later than **December 4, 11:55 pm** will not be accepted.

A detailed description of this assessment will be available on OWL Brightspace.

- **Weekly quick quizzes (8%)**

The purpose of these quizzes is to serve as quick check points. They help you keep up with the pace of the course. There are typically ~1-3 questions per 1-hour lesson. The quiz questions will be posted weekly on OWL (typical on Mondays), and will only remain active for that week. It is not mandatory to answer all the questions, and only correct answers will be recorded as valid answers. At the end of the semester, the total # of valid (correct) answers will be counted, and the marks will be assigned based on the # of valid answers among the total # of quiz questions released throughout the semester. You will be marked following the scheme below:

$$N = \frac{total\ valid\ answers\ provided}{total\ number\ of\ quiz\ questions}$$

8 points: N ≥80%
7 points: 79% ≥ N ≥70%
6 points: 69% ≥ N ≥60%
5 points: 59% ≥ N ≥50%
4 points: 49% ≥ N ≥40%
3 points: 39% ≥ N ≥30%
2 points: 29% ≥ N >0
0 point: N=0

You may choose to skip this evaluation and have its weight transferred to the final exam. In this case, do not make any submission attempt.
However, if you made as few as one attempt at the quizzes, the marking rubric applies immediately, and no academic consideration will be accepted.

- **Assignments (12%)**

There are a total of FOUR assignments of equal weight. They are released at the end of each Theme though OWL Gradescope. Once released, you may work on it anytime, and there is no time restriction after you start. Submission deadline is typically one week after the release date of the each assignment. Detailed deadline will be announced on OWL.

A No-Late-Penalty Period applies to each assignment submission. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 48 hours past the deadline without a late penalty. Should students submit their assessment beyond 48 hours past the deadline, a late penalty of 10% per day will be applied to the total mark owned for the submitted work. Submission 1 week later than the originally set deadline will not be accepted.

You must submit at least 2 out of the 4 assignments. Students who fail to meet this requirement, whether excused or not, will receive 0% for the assignment component of the course grade.

- **Mid-term (25%) and Final Exam (35%)**
  - **Mid-term test** will cover all the material in the first two themes (approximately). The exact cut-off material will be announced in class and on OWL.
    A student who misses the midterm test AND is granted academic consideration will be offered to write a makeup test (typically scheduled a week after the midterm test). If the

student misses the makeup test and is also excused, the weight of the missed test will be transferred to the final exam.

- The **Final Exam** will be cumulative. Material covered on the mid-term test will be assessed on the final exam through similar questions that appeared on the midterms. Details will be provided in late November.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

6. Additional Statements

Religious Accommodation
When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

https://www.edi.uwo.ca.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

Academic Policies
The website for Registrar Services is https://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 their official university address is attended to in a timely manner.

Use of electronic devices: Only basic scientific calculators are permitted on all tests and exams. All other electronic devices (cell phones, laptops, tablets, cameras, etc.) are prohibited. Students found in possession of prohibited devices will receive a mark of ZERO for the entire 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 the following Web site:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Support Services

Please visit the Science & Basic Medical Sciences Academic Advising 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 who are in emotional/mental distress should refer to Mental Health@Western (https://uwo.ca/health/) for a complete list of options about how to obtain help.

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.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at Learning Development and Success (https://learning.uwo.ca) 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 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, https://westernusc.ca/services/.