Chemistry 2210A
Chemistry of the Environment
Course Outline Fall 2020

This document provides you with important information regarding this course.
Please refer to this document throughout the term.

Updated: September 18, 2020

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 fuels and other power sources, and water purification.

Course Instructor
Dr. Lijia Liu, PhD
Email: lijia.liu@uwo.ca
Office: Room 066 (Lower Ground Floor), Chemistry Building, Western University
Office Hours: Due to the special circumstance of online learning, all communication will be conducted on OWL (through forum) or by 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 email from your @uwo.ca account and use “CHEM 2210A – Email Topic” in the subject line to ensure that your email reaches me.

Class Information
Section: 001
Class Time: Mondays, Wednesdays & Fridays, 1:30 – 2:30 pm

Please note that due to COVID-19, Chem 2210A course offered in Fall 2020 will be conducted fully online via OWL in an asynchronous learning mode. New learning materials will be published online on a weekly basis (typically on Mondays). Although you are free to arrange your time to complete the required learning activities, please check the OWL website regularly to keep up with your learning progress.

Requisites
The prerequisites for Chemistry 2210A are: Chemistry 1301A/B and 1302A/B; OR Chemistry 1301A/B and Integrated Science 1001X; OR the former Chemistry 1100A and 1200B.
The antirequisites for Chemistry 2210A are: CEE 2217A/B AND Chemistry 4491E.

Unless you have either the prerequisites for this course or written special permission from your Dean 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.

Accessibility
Please contact the course instructor if you require 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 (formerly Services for Students with Disabilities) at 661-2147 or http://www.sdc.uwo.ca/ssd/ if you have questions regarding accommodation.

Course Website
All teaching activities will be conducted on Western’s OWL system (http://owl.uwo.ca), under our OWL course page. This is the primary learning platform on which information will be distributed to all students in the course. Lectures, discussions, self-assessment quizzes, assignments, and all course-related evaluations will be conducted on OWL as well.

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 air quality, climate, energy, and water.
• Summarize key chemistry processes occurring in the environment to a first-year science student audience through the Group Infographic Assignment.
• Analyze current news articles related to environmental chemistry issues through the Chemistry in the News VoiceThread Discussion.
• 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. (Topic 1)
• Identify the root causes and consequences of polluted air. (Topic 2)
• Explain the natural greenhouse effect and how the temperature of the planet is maintained in equilibrium. Identify the impact of human industrial activity and the contribution of carbon dioxide to global warming. Distinguish between global warming and the “greenhouse effect”. Distinguish between biofuels and fossil fuels. Compare renewable energy technology options. (Topic 3)
• Explain the chemistry of natural and polluted water. Identify how water quality is impacted by human activity. Explain how water is purified for human consumption. (Topic 4)

Course Materials
Textbook
It is strongly recommended that you acquire a copy of this textbook, which is available at the Western Bookstore.

Baird and Cann
Environmental Chemistry, 5th Edition
Freeman
The 4th Edition of the text is suitable for most of the course material, but please note that the chapters have been renumbered from the 4th to 5th edition, so care must be taken if you choose to use the 4th edition.

Lecture notes
Lecture videos, reading materials, and other learning resources will be posted on OWL.
Anticipated Course Topics (subject to revision*)

<table>
<thead>
<tr>
<th>Textbook Chapter</th>
<th>Title Description</th>
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<tbody>
<tr>
<td>Baird &amp; Cann Environmental Chemistry 5th Edition</td>
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</tr>
<tr>
<td>1</td>
<td>Stratospheric Chemistry: The Ozone Layer</td>
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<td>2</td>
<td>The Ozone Holes</td>
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<td>3</td>
<td>The Chemistry of Ground-Level Air Pollution</td>
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<td>4</td>
<td>The Environmental and Health Consequences of Polluted Air – Outdoors and Indoors</td>
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<td>5</td>
<td>The Greenhouse Effect</td>
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<td>6</td>
<td>Energy Use, Fossil Fuels, CO₂ Emissions and Global Climate Change</td>
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<td>7</td>
<td>Biofuels and Other Alternative Fuels</td>
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<td>8</td>
<td>Renewable Energy Technologies</td>
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<tr>
<td>10</td>
<td>The Chemistry of Natural Waters</td>
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<td>11</td>
<td>The Pollution and Purification of Water</td>
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*Although the topics listed above are the intended course topics, the instructor reserves the right to deviate from this list should an interesting topic of environmental concern appear in the news.

Anything that is covered in class or in an assigned reading is “testable”. If it is not covered in class, and it is not in any readings I may assign, it is not testable.

Course Evaluation

Your course grade, out of 100, will be calculated as listed below. You must achieve a grade of 50% or greater to pass the course.

<table>
<thead>
<tr>
<th>Component</th>
<th>Date</th>
<th>Weight (normal)</th>
<th>Weight (missed midterm)</th>
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<tbody>
<tr>
<td>Chemistry in the News VoiceThread Discussion</td>
<td>Throughout the term Reflection assignment due Monday, November 9, 2020</td>
<td>20%</td>
<td>20%</td>
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<tr>
<td>Infographic Assignment</td>
<td>Assignment submission due Friday, November 27th, 2020 Viewing/evaluation during Monday, Nov.30th and Friday, Dec. 4th, 2020</td>
<td>15%</td>
<td>15%</td>
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<tr>
<td>Self-assessment quizzes</td>
<td>At the end of each topic (total of 4)</td>
<td>5%</td>
<td>5%</td>
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<tr>
<td>Mid-term Exam</td>
<td>Saturday, October 31st, 2020</td>
<td>25%</td>
<td>-</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Scheduled by the Registrar</td>
<td>35%</td>
<td>60%</td>
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❖ Chemistry in the News VoiceThread Discussion
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
- **Replying** to classmates’ posts throughout the six discussion weeks
- **Synthesizing** your discussion experience by responding to reflection questions

The Chemistry in the News discussion groups will be announced on **Friday, September 11th**. The discussion forums will open on **Monday, September 21st** and close **Sunday, November 1st, 2020**. Once the discussion closes, you will compile your post and responses to reflection questions. This compiled Reflection is due on OWL (under Assignments) by **Monday, November 9th, 2020**. You are welcome to submit this reflection earlier, but late submissions will be deducted 10% per day unless academic consideration or accommodation is obtained. This Reflection will be graded, while the actual VoiceThread on OWL will be referenced to confirm dates and posts, to determine your grade for this assessment.

A detailed description of this assessment will be available on OWL, along with a rubric for assessment.

❖ Infographic Assignment
The purpose of this assignment is to have you explore a Chem 2210A topic more deeply, and synthesize the key issues by demonstrating your understanding of this topic. Organizing and teaching someone else a topic allows you to learn the issues more deeply yourself. These infographics will also be a valuable review tool to share with your classmates during the Infographic Display Week, which is scheduled toward the very end of the class. In pairs, you will select a topic covered in Chem 2210A and prepare an infographic summarizing key ideas and equations in a visually appealing way, accessible to a first-year science audience.

This infographic will be evaluated through a peer-review system (i.e. your work will be evaluated by your classmates and you will also evaluate their works) for scientific accuracy, clarity of explanations and images, visual appeal, and accessibility to a first-year science student audience. Rubric will be provided to ensure consistent marking. This assignment must be submitted by **Friday, November 27th**. Late submission will be subjected to a 30% deduction. Submission after **November 29th** will not be accepted. Peer-review will be conducted during the week of **November 30th – December 4th**.

A detailed description of this assessment will be available on OWL, along with a rubric for assessment.

❖ Self-assessments
A set of self-assessment quizzes (total of 4) will be posted at the end of each topic. These are **Asynchronous** quizzes with time restrictions. The quizzes are released at the end of each topic, usually on Fridays (exact date will be announced), and remain active for one week. The quizzes are expected to take no more than 40 min to complete. You may take the quiz at any time while it is active. Once you start, you must complete it within 120 min. The purpose of these assessments is to help you digest the important knowledge delivered in the course. The evaluation of these assessments will be a pass/fail scheme (50% correctness is a pass).
Mid-term and Final Exam
Mid-term and Final exams will be held as synchronous, remotely proctored exams on OWL using ProctorTrack. Detailed instructions on how to prepare for the exams as well as ProctorTrack tutorial will be posted before Mid-October.

- **Mid-term test** will cover all the material in the first two topics (approximately). The exact cut-off material will be announced on OWL. Mid-term test will be held on **Saturday, October 31st**. The mid-term is expected to take no more than 60 min to complete, but you will be given 90 min to complete the exam.

- The **Final Exam** will be cumulative, but material covered on the mid-term test will be assessed on the final exam through similar questions that appeared on the midterms. The expected amount of time to complete the exam is 2 hours, but extra time will be allowed. Details will be provided in late November.

There is no make-up test for the mid-term. If your faculty Dean's Office has approved your circumstances, the value of the mid-term test will be shifted to the Final Exam as described in the table shown on the previous page.

Tests and examinations in this course will be conducted using the remote proctoring service, Proctortrack. 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. More information about this remote proctoring service is available in the Online Proctoring Guidelines at the following link:

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. Information about the technical requirements are available at the following link:
https://www.proctortrack.com/tech-requirements/

Code of Conduct for Class and Online Discussion
To foster a supportive and enriching academic environment that is conducive to learning and free inquiry, Western has a Student Code of Conduct (http://www.uwo.ca/univsec/board/code.pdf).

As your instructor, I will promote this respectful and supportive virtual learning environment. In turn, I expect students in this course to also respect their fellow classmates and instructor through online discussions. Please be sure to phrase your ideas in a way that is respectful to all involved.

I will do my best to ensure lecture materials are published at the beginning of each week. I likewise expect you to be ready to engage in the weekly learning activities. I hope this course will be an excellent learning experience for you!

Policies

Email Policy
Please ensure your emails are written in a professional format and tone. If you have questions about specific course topics/questions, please use the **OWL forum** so that all students can benefit from the discussion.

In accordance with policy, http://www.uwo.ca/its/identity/activatennonstudent.html, 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.

**Academic Accommodation and Consideration**

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean’s Office/Academic Counselling unit of your Home Faculty. 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 scibmsac@uwo.ca. Their website is: http://www.uwo.ca/sci/undergrad/academic_counselling/index.html.

For further information, please consult the university’s policy on academic consideration for student absences:

If documentation is required to receive formal academic accommodation, students must deliver this documentation to the Dean’s Office/Academic Counselling unit of their Home Faculty (*not* to the instructor). Please visit the following link for policy on Accommodation for Illness:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

A student requiring documentation for academic accommodation due to illness must use the Student Medical Certificate (https://studentservices.uwo.ca/secure/medical_document.pdf) when visiting an off-campus medical facility. For further information, please consult the university’s medical illness policy at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

If you miss the Final Exam, contact your faculty’s Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special (or makeup) Exam.

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

**Equal Opportunity and Evaluation Policy**

The university is committed to academic integrity and has high ethical and moral standards. All students will be treated equally and evaluated using the criteria presented in this course outline and their respective weights. The evaluation criteria are based strictly on actual achievement, not on effort or how hard the student tried. Claims of an excellent academic history, of attendance in the course components, or of personal issues (family, relationship, financial, etc.) cannot be used to justify a higher grade in course because they are not criteria for evaluation.

There is no extra work available for extra credit or to “make up” another grade. No extra assignments, essays, experiments, or other work of any kind is offered to any student.

The requirement for a higher grade in order to, for example, maintain a scholarship, enter a program, or obtain a higher GPA for various reasons, is not a justifiable reason for increasing your grade. If we increased or “bumped” your grade (*i.e.* gave you a grade that you did not legitimately earn), it would be unfair to the other students and also a great disservice to the scholarships and programs who are evaluating all students on the basis of their grades.

Please contact your academic advisor if you require formal accommodation for missing a course component.
Support Services

Students are encouraged to make use of the free, study-skills courses and other services, including learning-skills counselling, provided by Learning Development and Success, learning.uwo.ca. Since this course includes multiple choice tests, I encourage you to take advantage of the free test-taking workshops offered to you!

A series of online tutorials of how to use specific OWL tools are available on:
https://owlhelp.uwo.ca/students/tools/index.html

The website for Registrarial Services is: http://www.registrar.uwo.ca.
The website for USC Services is: http://westernusc.ca/services/
Students who are in emotional/mental distress should refer to Mental Health@Western
http://www.health.uwo.ca/mental_health/ for a complete list of options about how to obtain help.

Crisis contact information is available at: https://wjwww.uwo.ca/health/mental_welbeing/\html

The policy on Accommodation for Students with Disabilities can be found here:
www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Department of Chemistry on Social Media:
Webpage - https://www.uwo.ca/chem/
Twitter - https://twitter.com/westernuchem
Facebook - https://www.facebook.com/ChemistryatWestern