**The Chemistry of Environmental Pollutants**

**CHEM3800A (Fall 2024)**

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| Course Instructor: Amy Rand **How to address me:** Dr. Rand**Gender Pronouns:** (she/her/hers) ([learn more](https://www.vanderbilt.edu/facultysenate/engage/PRONOUNPOSTER.pdf))**Email:** amy.rand@carleton.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 will respond to emails/messages about **lecture material** during student hours ONLY. Any **academic accommodations and missed course work** will receive a response from me within one business day. Student Hours: Wednesday & Friday, 1-2 pm**What are ‘Student Hours’?***Student hours are dedicated times through the week for the course instructor to meet with YOU. Pop in to introduce yourself, ask questions about the course, or discuss content from the course.**Note: If these times don’t work for you, email me and we can arrange an alternate time to meet.* | Office Location: Room 320, Steacie Building[Click here for visual directions](https://www.classfind.com/carleton/).**Class Location:** Room 238, Tory Building[Click here for visual directions](https://www.classfind.com/carleton/).**Modality:** in person, plus 1 asynchronous class (Nov 13)**Class Times:** Wednesday & Friday, 4:35pm-5:55pm**Prerequisites:** CHEM2207 or 2203 or 2800CHEM 2207: Intro to Org Chem ICHEM 2203: Org Chem ICHEM 2800: Foundations for Env Chem**Department:** Chemistry |

**Welcome!**

This course will build on the chemistry knowledge acquired in first and second year and apply it to problems in environmental science, with a focus on pollutants in biota, water, and air. It covers topics such as the sources, fate, transport, and transformation of pollutants, the chemistry of natural systems, and the impact of human activities on environmental quality. The course will also provide an opportunity to prepare a presentation of a case study in environmental chemistry. An existing knowledge of basic organic chemistry is expected and will not be reviewed in class.

**Course level learning objectives:**

1. Evaluate multidisciplinary issues using chemical toxicology and environmental chemistry knowledge and skills.
2. Describe major biochemical pathways targeted by toxicological hazards.
3. Relate physicochemical properties of chemicals to principles of ADME.
4. Understand the importance of information literacy.
5. Apply chemistry principles to predict the transport and fate of chemicals in the environment.
6. Describe various instrumentation and quantitation techniques that can be used for pollutant analysis.
7. Develop principles of effective communications, proficiency in structuring and organizing content for clear and compelling presentations.
8. Receive constructive feedback and learn to provide meaningful evaluations to peers.

**Inclusive teaching statement:**

I am committed to fostering an inclusive and equitable learning environment that values the diverse perspectives and experiences of every student. I recognize the importance of creating a space where all students feel respected, valued, and empowered to contribute. Throughout the semester, there will be opportunities to provide feedback about inclusive learning environments and would appreciate your support.

**Land Acknowledgement**

At Carleton University, it is important that we acknowledge that the land on which we gather is the traditional and unceded territory of the Algonquin nation.

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| DATE | **DAY** | **THEME** | **LEARNING OUTCOMES** | **PRESENTATION DUE DATES** | **ASSIGNMENT DUE DATE** |
| Sep 04 | W | Course Overview |  |  |  |
| Sep 06 | F | Toxicology 1 | 1-4 |  |  |
| Sep 11 | W | Toxicology 2 | 1-4 |  |  |
| Sep 13 | F | Toxicology 3 | 1-4 | Topic approval |  |
| Sep 18 | W | The Hydrosphere 1 | 5 |  |  |
| Sep 20 | F | The Hydrosphere 2 | 5 |  | Assignment 1 |
| Sep 25 | W | The Hydrosphere 3 | 5 |  |  |
| Sep 27 | **F** | The Hydrosphere 4 | 5 |  |  |
| Oct 02 | W | Pollutant analysis 1 | 6 |  |  |
| Oct 04 | **F** | **Class Cancelled** |  | Annotated bibliography |  |
| Oct 09 | W | Pollutant analysis 2 (Dr. H Lee) | 6 |  |  |
| Oct 11 | F | Microbial Life 1 (Dr. T Harris) | 5 |  | Assignment 2 |
| Oct 16 | W | Microbial Life 2 (Dr. T Harris) | 5 |  |  |
| Oct 18 | F | Chemistry of Waste 1 | 5 |  |  |
| Oct 23 | W | **FALL BREAK** |  |  |  |
| Oct 25 | F | **FALL BREAK** |  |  |  |
| Oct 30 | W | Chemistry of Waste 2 | 5 | Draft presentation |  |
| Nov 01 | F | Atm Chemistry 1 (Dr. J Corbin) | 5 |  |  |
| Nov 06 | W | Peer review presentations (virtual) | 7,8 |  |  |
| Nov 08 | F | Atm Chemistry 2  | 5 | Peer review |  |
| Nov 13 | W | **MIDTERM** |  |  |  |
| Nov 15 | F | Student Pres 1-5 | 7,8 |  |  |
| Nov 20 | W | Student Pres 6-9 | 7,8 |  |  |
| Nov 22 | F | Student Pres 10-14 | 7,8 |  |  |
| Nov 27 | W | Student Pres 15-18 | 7,8 |  |  |
| Nov 29 | F | Student Pres 19-23 | 7,8 |  |  |
| Dec 04 | W | Student Pres 24-27 | 7,8 | Reflections |  |

Note: Some classes might be moved online pending unforeseen illness, etc.

**Assistance for Students**

Academic and Career Development Services: <http://carleton.ca/sacds/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>

**Learning Materials**

**Suggested textbook:**

G. vanLoon and S. Duffy (2011). *Environmental Chemistry: A Global Perspective, 3 Ed.* Oxford University Press.

**Technology Checklist:**

* An internet-enabled computer (laptop/desktop)
* Zoom software installed on computer (can also install on phone as backup!)
* Access to reliable internet

*For students who do not have access to these resources: Options include* [*financial aid from Carleton*](https://www6.carleton.ca/awards/other-assistance-2/)*, inexpensive options for technology (Best Buy refurbished products, Kijiji), & single workspaces available for student use on campus.*

**Assessment in this Course**

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.

 I will 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**

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| --- | --- |
| Component | Grade Value |
| Assignment 1 | 15% |
| Assignment 2 | 15% |
| Midterm | 30% |
| PRESENTATION | 40% |

**Assignments**

There are three assignments in this course. Full assignment descriptions and marking rubrics will be posted on Brightspace.

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| --- | --- | --- | --- |
| Assignment | Grade Value | Topic | Due |
| 1 | 15% | Toxicology | Sep 20 |
| 2 | 15% | The hydrosphere | Oct 11 |

**Late Assignment Penalties:**

Late assignments will lose 10% per day (1 grade point value). An assignment can no longer be submitted 9 days following its initial deadline.

**Midterm Exams**

One midterm will take place in the classroom. The midterm will consist of multiple choice, short answer and problem-solving questions like the ones that we have practiced in the course and on assignments.

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| Midterm | Grade Value | Topic | DATE |
| 1 | 30% | All lectures to date | Nov 13 |

Looking for help preparing for midterms? [Student Academic Success Services (SASS)](https://carleton.ca/parents/2019/discover-carletons-student-academic-success-services/) at Carleton offers course-targeted study groups and supports and the [Science Student Success Centre (SSSC)](https://sssc.carleton.ca/) provides help with study skills.

**Presentations, reflections, peer-evaluations**

There will be individual presentations expected to take 15 minutes each of class time. More detail on the expectations for the presentation and the peer evaluations will be provided.

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| Presentation | Grade Value | Grade Distribution | DATE |
| 1 | 40% | Annotated bibliography | 8% | Oct 04 |
|  |  | Presentation draft | 6% | Oct 30 |
|  |  | Peer review | 6% | Nov 08 |
|  |  | Final presentation | 14% | Nov 15-Dec 04 |
|  |  | Reflection paper | 6% | Dec 04 |

**Extra Credit**

I will offer an extra credit of 1% or 2% to students’ final grades for the completion of surveys and questionnaires posted throughout the course. This feedback is vital to the improvement of this course for future students and will be very valuable for instructors to help them learn and grow. These surveys are anonymous and student identity will not be available to the instructor.

**Mental Health**

If you are struggling, please do not hesitate to reach out. I am happy to listen, and/or direct you to resources that might help. In terms of class, if you need extra help or missed a lesson, don’t stress! Email me and we will set a time to meet. Remember that Carleton also offers an array of mental health and well-being resources, which can be found [here](https://carleton.ca/wellness/).

**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

A = 85-89 B = 73-76 C = 63-66 D = 53-56

A- = 80-84 B- = 70-72 C- = 60-62 D- = 50-52

F = <50

WDN = Withdrawn from the course

DEF = Deferred

**Academic Accommodations, Regulations, Plagiarism, Etc.**

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)

* + **Deferred/missed term work for short-term accommodation (5 days or less)**: Please submit to me via email a [self-declaration form](https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf) to discuss the appropriate accommodation.
	+ **Deferred/missed term work for longer term incapacitation (5 days or longer);**  Please email me for guidance about how accommodation needs can be met for CHEM3800. You will need to go to the Registrar’s Office for support, but it is important that I am apprised of the long-term accommodation needs.

**Academic Integrity**

Academic Integrity is upholding the values of honesty, trust, respect, fairness, responsibility, and courage that are fundamental to the educational experience. Carleton University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university’s collective commitments to fairness, equity, and integrity.

(Adapted from [Carleton University’s Academic Integrity Policy](https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy-2021.pdf), 2021).

**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](https://drive.google.com/file/d/1_00OO7zG7rSQsgM1olTaiX3xRoLoE79x/view)to ensure you understand your responsibilities as a student with respect to academic integrity and this course.

**Sanctions for Not Abiding by Carleton’s Academic Integrity Policy**

A student who has not upheld their responsibilities under Carleton’s Academic Integrity Policy may be subject to one of several sanctions. A list of standard sanctions in science can be found [here](https://science.carleton.ca/academic-integrity/).

Additional details about this process can be found on [the Faculty of Science Academic Integrity website.](https://science.carleton.ca/academic-integrity/) Students are expected to familiarize themselves with and follow the Carleton University [Student Academic Integrity Policy](https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy-2021.pdf). The Policy is strictly enforced and is binding on all students.

**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](https://carleton.ca/studentaffairs/student-rights-and-responsibilities/#sect1.1) 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.

**Student Concerns**

If a concern arises regarding this course, **your first point of contact is me**: Email or drop in during student hours and I will do my best to address your concern. 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](https://carleton.ca/ombuds/).