

CHM310: Environmental Fate and Toxicity of Organic Contaminants

Winter 2022

Schedule

Lecture: Tues/Thurs 2:00-3:00,

Office hours: Wed 2:30 – 3:30, LM 321A

Contact Information

Prof. Hui Peng, LM 321A, 416-978-3596, hui.peng@utoronto.ca

Course Overview

Organic chemical contaminants surround us in our everyday lives (medications, personal care products, flame retardants, refrigerants...) and because of this they are present in the environment and in ourselves. In this class we will explore the fate of chemicals in the environment as a whole, as well as in the body, to understand how chemicals can be designed to limit the risks associated with their use and unintended release. Specific topics will include: environmental partitioning; environmentally-relevant transformation processes; the chemistry and effects of redox active species; the toxicity and detoxification of electrophilic species in the body.

Learning Objectives

1. As a CHM310 student you will be able to predict **where** in the environment (air, water, soil, biota...) an organic chemical would be expected to be found as well as **how** it might undergo degradation using only its chemical structure...
2. Toxicology is another major topic in CHM 310, upon completion of this class you will be able to assess the toxicity potency and health impacts of chemical contaminants.

Grading

Tutorial Assignment 1	5 %
Tutorial Assignment 2	5 %
Tutorial Assignment 3	5 %
Tutorial Assignment 4	5 %
Midterm (Thursday March 3 rd)	30 %
Final exam (cumulative, during finals period)	50 %

Course website

All material including presentation slides and literature resources, when provided, will be available on Quercus. You are responsible for checking this site regularly for announcements and content. I will be posting relevant slides at least 24 hours before class.

Lecture Schedule

Dates		Due Dates	Topics Discussed
January	11	T	Introduction
	13	R	U1: Basic environmental chemistry concepts
	18	T	
	20	R	U2: Chemical partitioning and environmental fates of contaminants
	25	T	
	27	R	
February	1	T	
	3	R	
	8	T	U3: Chemical transformations of contaminants
	10	R	
	15	T	
	17	R	
	22	T	Reading week
24	R	Assignment 2	
March	1	T	U3: Chemical transformations of contaminants
	3	R	Midterm
	8	T	U3: Chemical transformations of contaminants
	10	R	
	15	T	
	17	R	
	22	T	U4: What makes a chemical toxic?
	24	R	
	29	T	
31	R	U5: Electrophiles and water disinfections	
April	5	T	
	7	R	Assignment 4 Review

Tutorial Objectives:

Tutorials, which will be scheduled roughly every two weeks. Two types of tutorials will be provided: 1) R programming. One of the tutorial objectives is to introduce R program based environmental modeling. 2) Going through practice questions and assignments, as well as prior years' term tests and final exams. Four assignments are expected to be completed through tutorials.

Academic Integrity

While I encourage you to discuss your understanding of course material with others, any material that you submit or present **MUST** represent your own independent work and comprehension. Information about academic integrity can be found here: <http://www.artsci.utoronto.ca/osai/>

Accommodations

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability or health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at (416) 978 3596; <http://accessibility.utoronto.ca>

Absences

Students who miss a test or assignment deadline should contact Professor Peng as soon as possible, and no later than one week after returning to class. A legitimate reason for an absence or missed deadline due to medical, personal, or family reasons should be documented by one of the following: 1) U of T Student Medical Certificate; 2) Student Health or Disability Related Certificate; 3) College Registrar's Letter; or 4) Accessibility Services Letter. In the absence of a legitimate reason for missing a test or assignment you will receive a grade of 0 on the test, and a deduction of 10% per day (including weekends) for assignments.