

CHMD59F/CHM1425H/EES1121H Modeling the Fate of Organic Chemicals in the Environment

This course will introduce quantitative approaches to describing the behaviour of organic chemicals in the environment. Building upon a quantitative treatment of equilibrium partitioning and kinetically controlled transfer processes of organic compounds between gaseous, liquid and solid phases of environmental significance, it will be shown how to build, use, and evaluate simulation models of organic chemical fate in the environment. The course will provide hands-on experience with a variety of such models.

Instructor:	F. Wania Office EV-448 (University of Toronto Scarborough) Tel. 416-287-7225 E-mail: frank.wania@utoronto.ca		
Format:	2-hour lecture, followed by 1-hour tutorials		
Time:	Wednesday, 9:00 to 12:00		
Location:	IC 326, UTSC Campus		
Office Hours:	On-line, by appointment only (write e-mail for scheduling)		
Grading:	CHM1425H EES1121H	CHMD59F	
	2 Take-home assignments	20 %	30 %
	Paper summary presentations	10 %	10 %
	1 Term project/paper	30 %	30 %
	1 Project presentation	10 %	
	1 Final exam	30 %	30 %
	For those taking the course at the graduate level:		
	- the expectation with respect to the term project/paper are higher		
	- a short oral presentation on the term paper/project is expected		
	- the final exam will include more challenging questions		
	Evaluation will be carried out in accordance with the Graduate Grading and Evaluation Practices Policy (and how that policy is interpreted and applied in this Dept.)		
	https://governingcouncil.utoronto.ca/secretariat/policies/grading-practices-policy-university-assessment-and-january-1-2020		
Prerequisites:	An introductory course in each of organic, physical and environmental chemistry.		
Textbook:	Not any one textbook includes all the material covered in this course. Reading assignments (e.g., textbook chapters, scientific publications) will be given during each lecture. Useful for reference will be the following books:		
	Mackay, D. <i>Multimedia Environmental Models. The Fugacity Approach</i> . Lewis Publ. Chelsea, MI		
	Schwarzenbach, R., Gschwend, P., Imboden. <i>Environmental Organic Chemistry</i> . J. Wiley & Sons, NY		
	These books will be available upon request.		

Course Outline

#	Date	Topic (tentative)
0	Sep 4	CHMD59 only: Introduction to environmental contaminant chemistry (especially for those undergraduate students that do not meet the prerequisite of having taken an introductory environmental chemistry course, such as CHMB55)
1	Sept. 11	Introduction: Motivation and Mass Balance, System Definition
2	Sept. 18	Segmentation/Compartmentalization
3	Sept. 25	Expressing Equilibrium Phase Distribution: Distribution Coefficients and Linear Free Energy Relationships
4	Oct. 2	Expressing Equilibrium Phase Distribution: Measurement, Estimation and Selection of Phase Partitioning Equilibria
5	Oct. 9	Expressing Equilibrium Phase Distribution: Equilibrium Models and the Chemical Partitioning Space
6	Oct. 16	Expressing Kinetic Phenomena: Transformation and Advective Transport
7	Oct. 23	Expressing Kinetic Phenomena: Diffusive Transport Processes and level III Models
	Oct. 30	undergraduate reading week, graduate student project finalization
8	Nov. 6	Expressing Kinetic Phenomena: Measurement and estimation of mass transfer coefficients and rate constants
9	Nov. 13	Modelling Bioaccumulation and Food Chain Transfer of Contaminants
10	Nov. 20	Examples of Model Application
11	Nov. 27	Examples of Model Application
12	Dec. 4	Student presentations on term project by those taking the course at the graduate level
	Nov. 27	Due date for term papers for those taking the course at the undergraduate level
	Dec. 11	Due date for term papers for those taking the course at the graduate level

LATE WORK

For every day that an assignment or term paper is handed in late, I will deduct 10 % of the mark on that assignment/report.

PLAGIARISM

University of Toronto code of Behaviour on Academic Matters states that "it shall be an offense for a student knowingly: to represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e., to commit plagiarism."

For accepted methods of standard documentation formats, including electronic citation of internet sources please see the UofT writing website at: <http://www.writing.utoronto.ca/advice/using-sources/documentation>

EMERGENCY PLANNING

Students are advised to consult the university's preparedness site (<http://www.preparedness.utoronto.ca>) for information and regular updates regarding procedures relating to emergency planning.

COURSE POLICIES

Each member of this course is expected to maintain a:

- i. professional and respectful attitude during all course activities, including classes, laboratories, tutorials, and other online activities.
- ii. personal calendar/schedule/organizer to ensure that all course activities are completed, and due dates are met.
- iii. collection of notes recorded independently based on concepts covered in course activities (students registered with Accessibility Services requiring a class note-taker will have access to this accommodation)
- iv. familiarity with the university policy on Academic Integrity

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. The course instructor will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and I wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment, and hate speech will not be tolerated. If you have any questions, comments, or concerns, we encourage you to reach out to the staff in our [Equity Offices](#).

INSTITUTIONAL POLICIES AND SUPPORT

ACADEMIC INTEGRITY

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously.

The [University of Toronto's Code of Behaviour on Academic Matters](#) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see www.academicintegrity.utoronto.ca/).

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If a student wishes to copy or reproduce class presentations, course notes or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an infringement of copyright and is absolutely prohibited. More information [regarding this is available here: https://teaching.utoronto.ca/ed-tech/audio-video/copyright-considerations/](https://teaching.utoronto.ca/ed-tech/audio-video/copyright-considerations/)

ACCESSIBILITY NEEDS

Students with diverse learning styles and needs are welcome in this course. The University of Toronto is committed to accessibility: if you require accommodations for a disability, or have any other accessibility concerns about the course, please contact [Accessibility Services](#) as soon as possible.

ACCOMMODATIONS FOR RELIGIOUS OBSERVANCES

Following the University's policies, reasonable accommodations will be made for students who observe religious holy days that coincide with the due date/time of an assignment, tutorial, class or laboratory session. Students must inform the instructor before the session/assignment date to arrange accommodations.

ADDITIONAL SERVICES & SUPPORT

The following are some important links to help you with academic and/or technical service and support:

- School of Graduate Studies' [Policies and Guidelines](#)
- Full library service and resources on conducting online research through University of Toronto Libraries [University Libraries Research](#)
- Resources on academic support from the [Academic Success Centre](#)
- Learner support at the [Writing Centre](#)
- Information for [Technical Support/Quercus Support](#)

ACKNOWLEDGEMENT OF TRADITIONAL LANDS

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca and, most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.