

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

This course will give an introduction to 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.

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Format: 2 hours lecture, followed by 1 hour tutorials

Time: Wednesday, 9:00 to 12:00

Location: MW 262, UTSC Campus

Office Hours: Wednesday, 13:00-15:00, or by appointment

Grading:	CHM1425H	CHMD59F
	EES1121H	
2 Take-home assignments	20 %	30 %
Paper summaries	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.)

<http://www.governingcouncil.utoronto.ca/policies/uniassgpp.htm>

Prerequisites: An introductory course in each of organic, physical and environmental chemistry.

Textbook: Not any one text book includes all of 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. *Multimedia Environmental Models. The Fugacity Approach*. Lewis Publ. Chelsea, MI

Schwarzenbach, R., Gschwend, P., Imboden. *Environmental Organic Chemistry*. J. Wiley & Sons, NY

These books will be available in SY-364.

Course Outline

#	Date	Topic (tentative)
0	Sept. 4	Catching up for those without CHMB55: Basics of Environmental Organic Chemistry
1	Sept. 11	Introduction: Motivation and Mass Balance, System Definition
2	Sept. 18	Segmentation/Compartmentalisation
3	Sept. 25	Expressing Equilibrium Phase Distribution: Distribution Coefficients and Linear Free Energy Relationships (given by A. Parajulee)
4	Oct. 2	Expressing Equilibrium Phase Distribution: Measurement, Estimation and Selection of Phase Partitioning Equilibria (given by A. Parajulee)
5	Oct. 9	Expressing Equilibrium Phase Distribution: Equilibrium Models and the Chemical Partitioning Space
	Oct. 16	UTSC undergraduate reading week
6	Oct. 23	Expressing Kinetic Phenomena: Transformation and Advective Transport
7	Oct. 30	Expressing Kinetic Phenomena: Diffusive Transport Processes
8	Nov. 6	Application of Simple Steady-State Models: Assessment of Persistence and Long Range Transport Potential, Sensitivity and Uncertainty Analysis
9	Nov. 13	Application of Non-Steady-State Models: Understanding Time Trends
10	Nov. 20	Modelling Bioaccumulation and Food Chain Transfer of Contaminants
11	Nov. 27	Examples of Model Application
12	Dec. 4	Student presentations on term project by those taking the course at the graduate level
	Dec. 11	Due date for term projects/papers

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>

The full Code of Behaviour regulations for graduate students could be found from consulting <http://www.sgs.utoronto.ca/facultyandstaff/Pages/Academic-Integrity.aspx>

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.

ACCESSIBILITY NEEDS

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact The UTSC Accessibility Services as soon as possible: <http://www.utsc.utoronto.ca/~ability/>

We also suggest you also refer to the following University of Toronto Scarborough Library link: <http://utsc.library.utoronto.ca/services-persons-disabilities>