

**Department of Civil and Environmental Engineering
Carleton University**

**ENVE 5701: Environmental Fate of Organic Pollutants
Winter 2016**

Instructor: Prof. Anh Pham
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Office hours: TBD
Meeting time: 14:35 – 17:25 Thursdays
Meeting place: ME4236

Grading:	Assignments (5):	20%
	Midterm:	25%
	Presentation	20%
	Final exam:	35%

Course objective: To introduce equilibrium, kinetic, and analytical approaches applied to quantitative description of processes affecting the *distribution* and *transformation* of organic pollutants in aquatic environment.

Prerequisites: Graduate standing in engineering/science or instructor's permission.

Required reading: Environmental Organic Chemistry, second edition. R. P. Schwarzenbach, P. M. Gschwend, D. M. Imboden. Wiley-Interscience 2003.

Homework: Five to seven problem sets will be assigned throughout the course. The purpose of the problem sets is to help you prepare for the material on the exams – the assignments don't really count for much of your grade, so please work independently!

Late policy: The homework should be turned in (in class) by the due date. If you cannot meet a deadline, please make arrangements with the professor **before** the assignment deadline; otherwise a mark of zero will be assigned. 50% of the grade will be deducted from the homework that was turned in late unless you can provide appropriate documentation.

Presentation: The class will break up into five or six groups (3 students/group). Each group will be assigned a series of papers on a particular topic. The group will read and critique the papers, and give a 45 min presentation about what they have read. More instruction will be provided in class.

Academic Accommodation: Students may need special arrangements to meet academic obligations during the term. For an accommodation request, the processes are described below.

Pregnancy obligation: Write to me with any requests for academic accommodations during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://carleton.ca/equity/>

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Approximate weekly outline

Week	Date	Topics
		Part I: Chemical Structure and Properties
1	Jan 6	Course overview. Atomic structure , organic compounds, covalent bonding
2	Jan 13	Intra and intermolecular forces Vapor pressure, aqueous solubility, acid dissociation
3	Jan 20	Air/water partitioning, sorption to particle, bioaccumulation
4	Jan 27	Analytical methods for the detection and quantification of organic pollutants
		Part II: Transformation Reactions
5	Feb 3	Chemical Kinetics: theory, kinetic equations, metal exchange
6	Feb 10	Substitution reactions, Hydrolysis
7	Feb 24	Redox reactions in natural systems
8	March 2	Redox reactions in engineered systems Chlorine, ozone, advanced oxidation processes
9	March 9	Surface catalysis
10	March 16	Direct photolysis
11	March 23	Indirect photolysis, surface reactions
12	March 30	Student's presentation
13	April 7	Student's presentation