

EOHS 543 / CEMM 523

ENVIRONMENTAL ORGANIC CHEMISTRY

(Call Number 68071, 4 Credits)

Lecture: Tuesday and Thursday 3:00 – 5:00pm, SPHW 121

Instructor: Dr. An Li.
Office: Rm 304, SPHW. 2121 W. Taylor Street.
Phone: 6-9597. Fax: 3-9898. Email: anli@uic.edu
Office Hours: Tuesday and Thursday 1:30 - 3:00pm

Website: <http://blackboard.uic.edu> (for registered students)
<http://tigger.uic.edu/~anli/teaching.htm#543> (for everyone)

Objective: This course is designed to provide up-to-date knowledge and skills needed in research involving organic environmental pollutants. The focus is the behavior of organic chemicals in the environment. Equilibrium phase partitioning and various transformation processes will be theoretically explained, and the process parameters will be estimated from chemical structures. Environmental transport and fate models will be used to assemble the properties in order to assess the behavior of organic chemicals under given environmental conditions.

Textbook: R. P. Schwarzenbach, P. M. Gschwend, and D. M. Imboden.
Environmental Organic Chemistry. 2nd Ed. John Wiley & Sons, Inc. 2003

Prerequisite: EOHS 440 / CEMM 441, or consent of the instructor

Homework: A homework set will be given each Thursday. It will be due on following Thursday. Each set will count for 20 pts. Four points will be deducted if handed in late.

Grading:	Homework:	200
	Project-1 (Literature Review):	40
	Midterm Exam:	100
	Project-2 (Fate Models):	60
	Final Exam:	100
	Total:	500

Note: Exams will be close-book, one-hour, in-class.

A: $\geq 90\%$; B: 75-89%; C: 60-74%; D: $<60\%$. (The scales are tentative.)

Suggested Readings

R. S. Boethling and D. Mackay. *Handbook of Property Estimation Methods for Chemicals*. Lewis Publishers. 2000

E. J. Baum. *Chemical Property Estimation: Theory and Application*. Lewis Publisher, 1997

D. W. Connell. *Basic Concept of Environmental Chemistry*. 2nd Ed. CRC Taylor & Francis Group. 2005

Computer Models (required)

EPA EPI Suite: <http://www.epa.gov/oppt/exposure/docs/episuitedl.htm>

SMILES: <http://www.daylight.com/dayhtml/doc/theory/theory.smiles.html>

EQC: <http://www.trentu.ca/cemc/models/EQC2.html>

Fugacity Level 3: <http://www.trentu.ca/cemc/models/L3280.html>

Computer Skills

Microsoft Excel and Powerpoint (required). ChemOffice (optional)

Student Responsibilities and Resources

Academic Integrity Statement

Academic dishonesty is considered to be an offense against the University, and I am obligated to report any incident to the Associate Dean for Academic Affairs in the School of Public Health. Academic dishonesty includes (but is not limited to): cheating or assisting someone else in academic dishonesty, plagiarism, unauthorized possession of class materials (e.g., tests, reserve materials), and unauthorized changing of one's grade. To understanding proper procedures for referencing citations and quotation from source documents, student may consult the instructor or websites, such as http://www.vanguard.edu/faculty/ddegelman/index.cfm?doc_id=796, on how to correctly cite material and ideas of others. Students are also strongly encouraged to review and use the UIC document addressing academic integrity at: <http://www.uic.edu/depts/sja/integrit.htm>

Disability Statement

If you need accommodations because of a disability and are registered with the Office of Disability Services at UIC, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class, at my office, or email me.

Mutual Tolerance and Respect Statement

Public health deals with controversial issues from multiple perspectives and consideration of these issues may cause disagreements among us or may evoke strong personal feelings, depending on our individual experience, histories, identities and worldviews. Therefore, in all of our interactions and communications, it is important that we strive to have mutual respect and tolerance for one another and for any course guests and members of the community with whom we come into contact. If you feel you have been offended by any content or interactions, you are encouraged to discuss this with the instructor or another faculty member.

EOHS 543 / CEMM 523
ENVIRONMENTAL ORGANIC CHEMISTRY

Outline of Lectures

(tentative)

Week 1	<u>Part I: Introduction</u>	Chap. 1
	Organic chemistry review / SMILES	Chap. 2
Week 2	Background thermodynamics	Chap. 3
Week 3-9	<u>Part II: Equilibrium Partitioning</u>	
	Vapor pressure	Chap. 4
	Activity coefficient and aqueous solubility	Chap. 5
	Air-solvent partitioning - Henry's Law	Chap. 6
	Organic liquid-water partitioning	Chap. 7
	Organic acids and bases	Chap. 8
	Sorption involving organic matter	Chap. 9
	Partitioning to living media	Chap. 10
Week 10	Project #1 presentation	
	Midterm exam	
Week 11	Spring break	
Week 12-15	<u>Part III: Transformation Processes</u>	
	Kinetics review	Chap. 12
	Chemical transformations - hydrolysis	Chap. 13
	Chemical transformations - redox	Chap. 14
	Direct and indirect photolysis	Chap. 15/16
	Biological transformation reactions	Chap. 17
Week 16	<u>Environmental Fate Models</u>	Handouts
Week 17	Project #2 due	
	Final exam	