

## ENVIRONMENTAL CHEMISTRY

EOHS440 (21584) / CME411 (23669), 3 Credit

**Lecture:** Tuesday and Thursday 4:00 – 5:30 pm, SPHW 121

**Instructor:** Dr. An Li.  
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Office Hours: Tuesday and Thursday 1:00 - 3:30pm

**Objective:** Students are prepared for further study in their areas and for advanced environmental chemistry courses by learning the basic chemistry concepts related to the naturally-occurring and pollution-related processes in air, water, and soil. Major organic and inorganic pollutant groups will be described. Quantitative calculations will be involved.

Through this course, students will understand, from a chemistry viewpoint, the major environmental issues the world is facing and our efforts to solve the problems. The chemistry concepts learned and/or refreshed will help in research and practice in areas such as exposure assessment, industrial hygiene, environmental engineering and management, environmental quality control, etc.

**Textbook:** vanLoon, G. W. and Duffy, S. J. *Environmental Chemistry – A Global Perspective*. 2<sup>nd</sup> Ed. Oxford University Press. New York. 2005.

**Prerequisite:** General Chemistry, 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. Three (3) points will be deducted if handed in late.

<b>Grading:</b>	Homework:	200	(20 x 10)
	Midterm Exam-1:	100	(Part A of textbook)
	Midterm Exam-2:	100	(Part B of textbook)
	Final Exam:	100	(Part C)
	Total:	500	

(Note: All exams are close-book, 1 ½ hour, in-class)

A: ≥90%; B: 75-89%; C: 60-74%; D: <60%.

(The scales are tentative.)

### Additional Readings

Baird and Cann, *Environmental Chemistry*. 3rd Ed. W.H.Freeman and Company, 2005

Connell, *Basic Concepts of Environmental Chemistry*. Lewis Press, 1997

Manahan, *Environmental Chemistry* 8<sup>th</sup> Ed. CRC Press. 2005

Ebbing, *General Chemistry*. 4th Ed. Houghton Mifflin Company. 1993.

## *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](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.

# CHEMISTRY FOR ENVIRONMENTAL PROFESSIONALS

## Outline of Lectures

(tentative)

Week 1	Chemistry review I – units, gas laws	
	The atmosphere, atmospheric chemistry, and air pollution	Chap. 1/2
Week 2	Chemistry review II - thermodynamics	
	Stratosphere Ozone	Chap. 3
Week 3	Chemistry review III - kinetics	
	Tropospheric chemistry	Chap. 4
Week 4	Tropospheric chemistry (cont.)	Chap. 4
	Precipitation, acid rain	Chap. 5
Week 5	The green house effect and global warming	Chap. 8
Week 6	<b>Midterm exam #1</b>	
	Basic water quality parameters	Chap. 9
Week 7	Gases in water	Chap. 11
Week 8	Organic matter in water	Chap. 12
	Metals in hydrosphere	Chap. 13
Week 9	Drinking water	
	From Lake Michigan to your faucet (guest lecture)	
Week 10	Wastewater Treatment	Chap. 16
	Stickney Water Reclamation Plant and the Deep Tunnel (field trip)	
Week 11	<b>Midterm exam #2</b>	
	Introduction to environmental organic chemistry	
Week 12	Mobility and transport ( $P^o$ , $S_w$ , $K_{ow}$ )	Chap. 20
	Persistence and stability (degradation processes)	
Week 13	Organic Pollutants - PCDD/Fs	handouts
Week 14	Organic Pollutants - PCBs, PBDEs, Pesticides	handouts
Week 15	Toxic metals	handouts
Week 16	<b>Final exam</b>	

EOHS 440  
Chemistry for Environmental Professionals

**Field Trip - Wastewater Management in Chicago**

Date/time

Friday, November 17, 2006. Shine or rain.  
Leave at 9:40 from the lobby on the 1st floor of SPHW (2121 W. Taylor). Try to be early. Do not be late! We need to get there at 10:00.  
Come back around 3:00 - 3:30.

Destinations

Morning: Stickney Water Reclamation Plant  
Afternoon: Mainstream of the Deep Tunnel

Important notes

Review the handouts about the Stickney Plant (attached) and the websites below about the Deep Tunnel.

<http://www.mwrd.org/plants/tarp.htm>  
[http://www.mwrdgc.dst.il.us/Engineering/virtual\\_tour/tour\\_tarp.htm](http://www.mwrdgc.dst.il.us/Engineering/virtual_tour/tour_tarp.htm)

You should have your own insurance in case of any accident. No complains or claim of compensation will be accepted by the driver, the teacher, or the School of Public Health if any accident, either on the road or at the destinations, would occur. If you do not agree with this, please do not come.

Bring your photo-ID. You must show it at the entrances.

You will sign a "Visitor Release Form" before entering the Stickney plant, and another one for the Deep Tunnel Mainstream. Read and understand it before signing.

Wear warm cloth, since we will spend most time outdoors at Stickney. Wear long pants and sturdy shoes, no sandals or high heels.

Lunch will be on your own at a fast food place (presumably Burger King) near the Mainstream. (Stickney cafeteria is no longer open for visitors)