

**PubH 6190
Environmental Chemistry
Fall 2015**

Credits: 3
Meeting Days: Tu-Th
Meeting Time: 9:45-11:00
Meeting Place: Moos 1-430
Instructor: Matt Simcik
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Office Hours: by appointment

I. Course Description

The class is a survey course that describes basic atmospheric chemistry principles, water chemistry principles, and soil chemistry principles and presents the chemistry behind current challenges to our air, water and soil environments. The last third of the course focuses on understanding the linkages and interactions of these three environmental media, and on gaining a quantitative understanding of how pollutants behave in the environment.

II. Course Prerequisites

One course each in gen chem, org chem or instr consent

III. Course Goals and Objectives

After completing this course, you should:

1. Be able to set up the equations to predict the relative distribution of a chemical among environmental media within relative significant figures given its physical/chemical properties and environmental conditions.
2. Be able to evaluate an historic chemical from the perspective of efficacy and environmental impact and make a compelling recommendation on whether or not it should have been registered under the Toxic Substances Control Act (TSCA).

IV. Methods of Instruction and Work Expectations

The class is a lecture class, with interactive teaching used as much as possible. Some classes will require group interactions, and the final project is a group project.

V. Course Text and Readings

The required readings include the textbook, Environmental Chemistry 9th Edition, by Manahan, and a collection of scientific journal articles.

The text can be purchased online. The book is a useful resource, and you will be responsible for reading most of it thoroughly. The final third of the course we will focus on readings from the literature, as there is no available text that covers this material sufficiently. The journal articles will be accessible via Moodle.

Section I.	Manahan Ch. 1, 2, 4
Section II.	Manahan Ch. 9 - 14
Section III.	Manahan Ch. 15, 16
Section IV.	Manahan Ch. 3, 5, 7
Section V.	Journal Articles

Note: the other chapters in Manahan are strongly encouraged but not required.

VI. Course Outline/Weekly Schedule

Class #	Date	Topic	Unit
1	Sept 8	I. Basic Concepts	Environmental chem, acid base
2	Sept 10		Redox, complexation, equilibria, kinetics
3	Sept 15	II. Atmosphere	Characteristics, reactivities, oxygen rxns
4	Sept 17		Ozone depletion
5	Sept 22		Global climate change
6	Sept 24		Criteria pollutants, photochemical smog
7	Sept 29		Atmospheric particulates
8	Oct 1		Toxic air pollutants
9	Oct 6		Discussion
10	Oct 8	Exam I	Parts I and II
11	Oct 13	III. Lithosphere	Soil: Chemical reactions
12	Oct 15		Structure
13	Oct 20		Environmental concerns
14	Oct 22	IV. Hydrosphere	Properties, limnology
15	Oct 27		Carbonate cycle
16	Oct 29		Organic carbon cycle
17	Nov 3		Water pollutants
18	Nov 5		Discussion
19	Nov 10	Exam II	Parts III and IV
20	Nov 12	V. Fate & Transport	Overview, modeling intro, pchem properties, equilibrium partitioning
21	Nov 17		Equilibrium partition coefficients
22	Nov 19		Atmospheric deposition processes
23	Nov 24		Atmospheric deposition processes
24	Dec 1		Modeling exercise
25	Dec 3		Water and sediment fluxes
26	Dec 8		Bioaccumulation
27	Dec 10		Group Project time and Presentation

			Tutorial
	Dec 15		Group Project time and Presentation Tutorial
	Dec 21	Final Paper	Final Group Paper due @ 1:30
Final Period	Dec 21	Presentations	Class Presentations, 1:30 – 3:30 PM
	Dec 22	Exam III	Exam III (Part V) due @ noon – takehome

VII. Evaluation and Grading

Three exams (66%), Project (22%), Homework (8%), Participation (4%)

The exams are approximately equally spaced through the semester, and are evenly weighted. The group project is the same weight as the exams. The homework is for your benefit, to test your understanding and to practice your problem solving skills; the credit for turning them in is an incentive to do them (pass-fail). I do not grade them but instead supply answers to assist as a study guide. You are expected to actively participate in class by asking questions and by participating in discussions. Participation in class will enhance your final grade if your grade falls between grades, and is weighted at 4%.

Students may change grading options during the initial registration period or during the first two weeks of the semester. The grading option may not be changed after the second week of the term.

Generally, the final course grade will conform to the following guidelines:

A 4.00 achievement that is outstanding relative to the level necessary to meet course requirements

A- 3.67

B+ 3.33

B 3.00 achievement that is significantly above the level necessary to meet course requirements

B- 2.67

C+2.33

C 2.00 achievement that meets the course requirements in every respect

C- 1.67

D+1.33

D 1.00 achievement that is worthy of credit even though it fails to meet fully the course requirements

F 0.00 failure to meet the course requirements

Course Evaluation

Beginning in fall 2008, the SPH will collect student course evaluations electronically using a software system called CoursEval: www.sph.umn.edu/courseval. The system will send email notifications to students when they can access and complete their course evaluations. Students who complete their course evaluations promptly will be able to access their final grades just as soon as the faculty member renders the grade in SPHGrades: www.sph.umn.edu/grades. All students will have access to their final grades through OneStop two weeks after the last day of the semester regardless of whether they completed their course evaluation or not. Student feedback on course content and faculty teaching skills are an important means for improving our work. Please take the time to complete a course evaluation for each of the courses for which you are registered.

Incomplete Contracts

A grade of incomplete "I" shall be assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., documented illness or hospitalization, death in family, etc.), the student was prevented from completing the work of the course on time. The assignment of an "I" requires that a contract be initiated and completed by the student before the last official day of class, and signed by both the student and instructor. If an incomplete is deemed appropriate by the instructor, the student in consultation with the instructor, will specify the time and manner in which the student will complete course requirements. Extension for completion of the work will not exceed one year (or earlier if designated by the student's

college). For more information and to initiate an incomplete contract, students should go to SPHGrades at: www.sph.umn.edu/grades.

University of Minnesota Uniform Grading and Transcript Policy

A link to the policy can be found at onestop.umn.edu.

VIII. Other Course Information and Policies

Grade Option Change (if applicable)

For full-semester courses, students may change their grade option, if applicable, through the second week of the semester. Grade option change deadlines for other terms (i.e. summer and half-semester courses) can be found at onestop.umn.edu.

Course Withdrawal

Students should refer to the Refund and Drop/Add Deadlines for the particular term at onestop.umn.edu for information and deadlines for withdrawing from a course. As a courtesy, students should notify their instructor and, if applicable, advisor of their intent to withdraw.

Students wishing to withdraw from a course after the noted final deadline for a particular term must contact the School of Public Health Student Services Center at sph-ssc@umn.edu for further information.

Student Conduct, Scholastic Dishonesty and Sexual Harassment Policies

Students are responsible for knowing the University of Minnesota, Board of Regents' policy on Student Conduct and Sexual Harassment found at www.umn.edu/regents/polindex.html.

Students are responsible for maintaining scholastic honesty in their work at all times. Students engaged in scholastic dishonesty will be penalized, and offenses will be reported to the SPH Associate Dean for Academic Affairs who may file a report with the University's Academic Integrity Officer.

The University's Student Conduct Code defines scholastic dishonesty as "plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis."

Plagiarism is an important element of this policy. It is defined as the presentation of another's writing or ideas as your own. Serious, intentional plagiarism will result in a grade of "F" or "N" for the entire course. For more information on this policy and for a helpful discussion of preventing plagiarism, please consult University policies and procedures regarding academic integrity: <http://writing.umn.edu/tww/plagiarism/>.

Students are urged to be careful that they properly attribute and cite others' work in their own writing. For guidelines for correctly citing sources, go to <http://tutorial.lib.umn.edu/> and click on "Citing Sources".

In addition, original work is expected in this course. Unless the instructor has specified otherwise, all assignments, papers, reports, etc. should be the work of the individual student. It is unacceptable to hand in assignments for this course for which you receive credit in another course unless by prior agreement with the instructor. Building on a line of work begun in another course or leading to a thesis, dissertation, or final project is acceptable.

Disability Statement

It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have a documented disability (e.g., physical, learning, psychiatric, vision, hearing, or systemic) that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact Disability Services to have a confidential discussion of their individual needs for accommodations. Disability Services is located in Suite 180 McNamara Alumni Center, 200 Oak Street. Staff can be reached by calling 612/626-1333 (voice or TTY).

Mental Health Services:

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. University of Minnesota services are available to

assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via www.mentalhealth.umn.edu