

The Chemistry of Natural Processes
Environmental Chemistry
Chemistry 320
Spring 2024

Instructor: Dr. M.A. Engen Office: PA 346

Office Hours: hours posted, by appointment, or open door

Email: mengen@winona.edu

Web Page: <http://course1.winona.edu/mengen/>

Course Purpose

The purpose of this chemistry course is to provide students with the knowledge to better understand and make informed judgments related to environmental issues. With the many environmental concerns facing our world today, and the likelihood of many more in the future, a basic understanding of the chemistry associated with many of the Earth's natural processes and the effects humankind have on these processes will help students become more informed members of our society in regards to the environment.

Course Description: Environmental Chemistry

This course is a study of chemical concepts and the application of those concepts to processes in natural systems. Concepts such as kinetics, thermodynamics, equilibrium, acid-base chemistry and electrochemistry will be especially important. With a solid understanding of these concepts, then an introductory study of current environmental issues, emphasizing the chemistry and chemical interactions underlying these topics will be addressed. The topics may include, but are not limited to global warming, depletion of stratospheric ozone, ground level air chemistry and air pollution, organic chemicals in the environment, toxic heavy metals, chemistry of natural waters, and energy production and its environmental consequences. Prerequisites: one year of general chemistry or consent of instructor. Offered every other year.

Lectures: 320 T, Th 11:00-11:20 PA 307

Lab: 320-1 W 2:00-4:50 SL 364

Text: “*Environmental Chemistry – Any edition.*” Colin Baird and
Michael Cann, Freeman- **Required**
(Solutions Manual – optional)

Grade Assignments

90% **A**
80% **B**
65% **C**
50% **D**

Marking Distribution

Lab	25 %
Exams (3)(15% each)	45 %
Articles	10%
Problems Sets	10 %
Packets	10%

Lecture Sessions

Tuesday – Lecture/Discussion period with an emphasis on problem solving and calculations.

Thursday – Lecture/Discussion period followed by student directed discussion of a relevant topic from the current literature. A typed outline of the article presented each Thursday will be required.

Articles

Each Thursday you will be expected to discuss with the class an article of your choosing. The article should reflect the topic(s) covered in lecture that week. ***A typed paragraph will be turned in and must be properly referenced (see homework link for reference information)***. The paragraph should include a brief outline (one paragraph) of the article and your thoughts (one paragraph) in regard to the policy ramifications associated with the article. The synopsis of the article must be submitted to the Dropbox folder (as a PDF document) before the start of the class period it is due to receive full credit.

Problem Sets

Assigned problems sets will be due for each module. Problems sets are linked on webpage. Dues dates will be posted in d2l. Scoring based primarily on completion.

Packets

Assigned packets will be due for each module. Packets are linked on webpage. Dues dates will be posted in d2l. Scoring based primarily on completion.

Laboratory

See link on webpage.

<i>Tentative Schedule</i>						<i>Schedule</i>
Week	Week of	Lecture	Chapter	Laboratory		Approx.
1	01/08	Atmospheric Chemistry	1-5			
2	01/15					
3	01/22					
4	01/29					
5	02/05	Climate Change	6-7			
6	02/12					
7	02/19					
8	02/26					Exam I
	03/04	Spring Break				
9	03/11	Water Chemistry	10			
10	03/18					
11	03/25					
12	04/01	Contaminants	12,13,14,15			
13	04/08					
14	04/15					Exam II
15	04/22	Nutrient Cycles - C, N, S, P				
16	04/29	Finals Week				Exam III

Schedule subject to change