

CHE246 Environmental Chemistry
Spring 2008
Confer-Vickner 333 MWR 10:30-11:20
Web site: Gustavus Moodle site

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Office Hrs: MW 2:30 -4:30
and by appt.

Text:

Baird, C. and Cann, M. Environmental Chemistry 3rd edition, Freeman, 2005.

Course Description

Environmental Chemistry explores both the underlying chemical aspects of environmental issues and the chemistry of Earth's natural processes in air, water, and soil. This course will cover the chemistry underlying environmental issues such as water pollution, smog, stratospheric ozone depletion, and global warming. Energy will also be a major topic of the course as we will examine current fossil energy and alternative energy sources. Environmental issues will be introduced topically and the chemistry and Earth processes related to the topic will be explored.

Grading

Quizzes (6)	30 %	A	>93%
Research Projects	20 %	A-	90-93
Class Participation	10 %	B+	87-90
Problem Sets	10 %	B	83-87
Mid-term exam (April 7)	15 %	B-	80-83
Final exam (May 23, 1-3)	15 %	C+	77-80
		C	73-77
		C-	70-73
		D	60-69
		F	<60

Quizzes

Quizzes will be a combination of multiple choice, short answer and problem solving. Makeup quizzes will only be allowed by prior arrangement and for legitimate reasons. Missed quizzes result in a score of zero.

Quiz 1	Feb 20
Quiz 2	Mar 5
Quiz 3	Mar 17
Quiz 4	Apr 21
Quiz 5	May 2
Quiz 6	May 16

Research Projects

The independent research project in this class can be lab-focused and/or data intensive. Each project must address an environmentally relevant topic and students must collect, analyze, interpret, and assess some of their own data. Students can work on the project independently or with a partner. Project updates will be given on Thursdays throughout the semester. Here is a list of potential project questions:

- What are the total CO₂ emissions for the Gustavus campus and how much would they be reduced by specific policies?

- What alternative energy sources could be used on campus? How much would they reduce fossil energy used on campus? What are the costs and benefits?
- Do Nalgene bottles leach bisphenol A? (chemically advanced project)
- What are the TSS and P levels in intermittent streams in the 7-Mile Creek Park? How important are they to TSS loads in the watershed?
- How much of the carbon captured in photosynthesis is eventually buried in lake sediments?
- How and why do anion concentrations vary in area lakes? (GIS knowledge useful)
- How do nitrate levels change in 7-Mile Creek during the spring flush?
- How do nitrate and other anion levels change in ground water at 7-Mile Creek during the spring flush?
- What are concentrations of PAHs in the air on campus? (advanced chemistry project)
- Can pharmaceuticals be identified in St Peter wastewater? (advanced chemistry project)

Timeline and project requirements (further guidance will be provided during the semester):

- Feb 18 = project selection
- Feb 25 = 1 page project proposals (include project objectives, methods to meet objectives, timelines for sample or data collection, appropriate references)
- Feb 28 = 5 minute introduction of topic
- March 20 = presentation on methods and data handling
- May 19: Final paper due, written in the ACS style acceptable for a research article in the journal *ES&T*

Problem Sets

Homework assignments are due at various times throughout the semester. Homework will consist of selected problems from the text and other problems. Late homework is not accepted.

Class Participation

Class attendance on Thursdays is required and all are expected to engage in discussions related to student projects and journal reading. The class participation grade will be based on involvement in class discussions, participation in current environmental chemistry discussions, and on attendance.

Academic Honesty

Every student is required to sign the honor code on each quiz or exam. Gustavus Adolphus College is proud to operate under an honor system. The faculty and students have jointly created an Honor Board to enforce this policy. Please see the academic catalog for full details of the academic honesty policy. Depending on the severity of the violation, in this class you will generally receive a zero for the first academic honesty violation and fail the course for a second violation. Homework assignments are exempt from the academic honesty policy in this course. In fact, you are encouraged to work together on homework assignments.