

CHEM 205: Environmental Chemistry
Spring 2016

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Classes: Monday, Wednesday, Friday 8:55-9:45am, Hall of Science 200

Labs: Monday, 1:15-4:15pm, Superlab (Hall of Science 205)

Office hours: M: 10:30-11:30 am
T: 9:00-10:00 am
W: 10:00-11:00 am
Th: 1:30-2:30pm

Please email me to set-up a meeting at another time.

Required textbook: Colin Baird and Michael Cann, "Environmental Chemistry," 5th edition (2012).

Course objectives:

By the end of this course, students should be able to:

- Use chemical principles to address environmental questions about the atmosphere, hydrosphere, and biosphere
- Discuss the interactions between different environmental systems
- Carry out an environmental analysis with modern instrumentation and analytical techniques
- Critically assess scientific studies of the environment

Course Content:

Subject	Classes (approx.)	Chapter in text
Introduction and concentration units	1	1, 3.1
Stratospheric ozone and the ozone hole; impact of nitrogen cycle	6	1,2, 5.16
Tropospheric air pollution: causes, effects, and proposed solutions	5	3, 4, 17
Climate change: causes, evidence, and proposed solutions	7	5,6
Alternative fuels and energy sources	4	7,8
Water: chemistry of natural waters, influence of climate change	7	10
Water purification and disinfection	3	11
Soil properties	1	16
Contamination and remediation of soils and water: heavy metals, pesticides and PCBs	5	12,13,14

Assessment (total: 500 points)

2 midterm tests, in class – **60 points each**

midterm 1: Friday, February 26

midterm 2: Friday, April 8

You may bring one page (one side) of handwritten notes and a scientific calculator to each test.

Homework – **50 points**

~every week; due Mondays at the **beginning** of class

Quizzes – **50 points**

First 10 minutes of Friday classes. Please bring a scientific calculator. The lowest quiz grade will be dropped.

Group presentation on alternative energy – **15 points**

In-class, Monday, March 18

Individual presentation and paper on environmental topic:

Presentations in-class and in lab period, Monday, April 25 – **25 points**

Paper due Friday, April 29 – **25 points**

Each student will prepare a 5-7 page (double spaced) paper and a 10 minute presentation to summarize a recent peer reviewed environmental chemistry publication. See

<http://pubs.acs.org/journal/esthag> for examples of recent papers in *Environmental Science & Technology*.

Final exam – **90 points**

11:30 am, Monday May 2

Cumulative, with emphasis on the last portion of the course.

You may bring one page (both sides) of handwritten notes and a scientific calculator to the exam.

Labs – **125 points**

Due at the **beginning** of lab one week after completion of in-lab component (see next page for lab schedule)

Grade guidelines:

A- to A+: 90s; B- to B+: 80s; C- to C+: 70s; D- to D+: 60s; F: <60%

Policy on late lab reports and class assignments

- Homework will be accepted **up to one day late**, with the loss of 10% of grade. Late labs will be accepted with the loss of 10% per day, including weekends. Late penalties start when class/lab begins.
- You may have one day grace for each of one assignment and one lab during the semester.

Policy on attendance

Class attendance and active participation will be considered when determining whether to elevate borderline grades (e.g. from B- to B etc.). As homework is handed in and quizzes take place at the start of the class period, on-time arrival will improve your grade.

If you have an unavoidable absence (due to an extenuating circumstance that is documented by an academic dean or health professional), please notify the course instructor as soon as possible. You are responsible for providing documentation and making arrangements in a timely manner or else a grade of zero will be assigned for missed work.

Policy on academic honesty

Please be familiar with the [college policy on academic honesty](#) that applies to this course. You may discuss assignments with others, but copying answers is not acceptable and will be penalized. The presentations and paper must fully cite all outside sources and use appropriate paraphrasing to avoid plagiarism.

Accommodations Statement

Students who wish to request accommodations in this class for a disability should contact the Academic Support Center, located on the lower level of Monocacy Hall, or by calling 610-861-1401. You are also welcome to contact me privately to discuss your academic needs; however, accommodations cannot be provided until authorization is received from the Academic Support Center.

Tentative Lab Schedule*

*Some experiments are particularly weather dependent since they involve outdoor sampling

January 18 – Spectrophotometry (due January 25)
January 25 – Ozone and its reactions (due February 1)
February 1 – Measuring atmospheric ozone (due February 8)
February 8 – Volatile Organic Compounds (due February 15)
February 15 – Infrared spectroscopy of greenhouse gases (due February 22)
February 22 – Synthesis and properties of biofuels (due February 29)
February 29 – Acid rain and buffers (due March 14)
March 14 – Water analysis part 1 (due March 21)
March 21 – Water analysis part 2 (due March 29)
March 28 – Heavy metals analysis part 1: soil collection (due April 18)
April 4 – Heavy metals analysis part 2: soil extraction (due April 18)
April 11 – Heavy metals analysis part 3: soil analysis (due April 18)
April 18 – Paper and presentation preparation
April 25 – presentations