

Point Loma Nazarene University
Department of Chemistry

**CHE4070 and 4070L – Environmental Chemistry
Spring Term, 2023**

MWF, 12:15 – 1:10 pm in RLC 104
Lab: Tuesday, 8:30 – 11:30 am

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Sator 206

Office hours: M, 1:30 – 2:30 pm; T, noon – 1 pm; Wednesday, 1:45 – 2:30 pm

Prerequisite

Successful completion of Analytical Chemistry (CHE2013) and Organic Chemistry I (CHE2094) are required.

Course Description

This course covers the chemistry of Earth's environment, including the natural chemical processes as well as anthropogenic contributions. The environment in this context is divided into the atmosphere, the hydrosphere, the lithosphere, and anthrosphere. Particular emphasis is given to human influences in each of these "spheres," including the causes, effects, detection, prevention, and mitigation of pollution. Environmental pollution is a global problem, with many technological and cultural causes, and as such requires an understanding of numerous disciplines in order solve. This course thus involves the integration of concepts from chemistry, biology, geology, ecology, atmospheric sciences, hydrology, toxicology, political science, and others.

Course Objectives

At the completion of this course, students will be able to:

- Apply knowledge from the course to environmental problems and solutions
- Discuss contemporary environmental science issues and the impact of environmental science in global and societal contexts
- Demonstrate knowledge of concepts and assumptions related to the processes impacting the fate of pollutants in the major environmental compartments at the Earth's surface (atmosphere, hydrosphere, geosphere)
- Synthesize and evaluate scientific information about the life cycle of environmental pollutants.
- Analyze samples using standard chemical instrumentation (GC, HPLC, IR, UV-vis, ICP) (lab)
- Design and conduct experiments related to environmental analysis (lab)
- Analyze and interpret data from environmental analysis (lab)
- Communicate technical information effectively (lab)

Textbook

Environmental Chemistry: An Analytical Approach, Overway, 1st edition, Wiley, 2017. ISBN: 978-1-118-75697-3

Lecture Materials

Lecture materials and other useful information will be available on Canvas.

Grading

The final grade will be determined as follows:

- Problem Sets, 20%
- Presentation, 20%
- In-Class Activities, 20%
- Midterm Exams, 20%
- Final Exam, 20%.

Letter grades will be assigned according to the following scale: A, 90 – 100%; B, 80 – 90%; C, 70 – 80%, D, 60 – 70%, F, below 60%.

Problem Sets

Each module will have one assigned problem set and it will be due two days after the last lecture of the module.

Presentation

Each student will deliver a 15–20 minute presentation discussing an environmental pollutant. You will need to summarize the courses, transport, and fates (including chemical reactions) of a single pollutant released into the environment. You will also need to find a published scientific research study that examines an environmental aspect of this pollutant and discuss the findings.

In-Class Activities

Various in-class activities will be graded during the semester. These could include discussions, worksheets, etc.

Exams

There will be two midterm exams during the semester and a final exam. The date of the midterm exams will depend on the pace of the class and at least one week notice will be given. The final exam will be on May 5th.

Topics and associated reading (timetable is best estimate of course progress)

Week	Dates	Topic
1	1/10 – 1/13	Course Introduction and Origins Reading: Chapter 1
2	1/16 – 1/20	Measurements and Statistics Reading: Chapter 2
3	1/23 – 1/27	Measurements and Statistics & the Atmosphere Reading: Chapters 2 and 3
4	1/30 – 2/3	The Atmosphere Reading: Chapter 3
5	2/6 – 2/10	The Atmosphere Reading: Chapter 3
6	2/13 – 2/17	Exam 1 (Chapters 1 – 3) The Lithosphere Reading: Chapter 4
7	2/20 -2/24	The Lithosphere Reading: Chapter 4
8	2/27 – 3/3	The Lithosphere and The Hydrosphere Reading: Chapters 4 & 5
Spring Break 3/6 – 3/10		
9	3/13 – 3/17	The Hydrosphere Reading: Chapter 5
10	3/20 – 3/24	The Hydrosphere Reading: Chapter 5
11	3/27 – 3/31	Review and Exam 2 (Chapters 4 & 5)
12	4/3 – 4/5	The Anthrosphere Reading: tbd
Easter Break 4/14 – 4/18		
13	4/10 – 4/14	The Anthrosphere and Special Topics Reading: tbd
14	4/17 – 4/21	Special Topics and Presentations
15	4/24 – 4/28	Presentations and Review
		Final Exam Friday , May 5, 10:30 am – 1:00 pm

PLNU Mission
To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

PLNU FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day and time**. The final examination schedule is posted on the [Undergraduate Records](#) site. No requests for early examinations or alternative days will be approved.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

SPIRITUAL CARE

PLNU strives to be a place where students grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If you have questions, a desire to meet with the chaplain, or if you have prayer requests, you can contact the [Office of Student Life and Formation](#).

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

SEXUAL MISCONDUCT AND DISCRIMINATION

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix