Point Loma Nazarene University
Department of Chemistry

CHE4070 – Environmental Chemistry
Spring Term, 2026

MWF, 12:15 – 1:20 pm in Latter 002
Lab: Wednesday, 2:45 – 5:45 pm, Sator 216

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Office hours: by appointment.

Prerequisite
Successful completion of Analytical Chemistry (CHE2013) and Organic Chemistry I (CHE2094 and CHE2096L) are required.

Course Description

This 3-unit 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 to solve. This course thus involves the integration of concepts from chemistry, biology, geology, ecology, atmospheric sciences, hydrology, toxicology, political science, and others.

Course Learning Outcomes

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.

Required Textbook: *Environmental Chemistry*, Baird & Cann, 5th edition, Freeman, 2012. ISBN: 978-1-4292-7704-4

Recommended Textbook: *Quantitative Chemical Analysis*, Harris & Lucy, 10th edition. This was the textbook you used in the Analytical Chemistry course.

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

Grading: The final grade will be determined as follows:

Prelecture Questions, 10%
Problem Sets, 10%
Presentation, 20%
Participation, 10%
Midterm Exams, 30%
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%.

Prelecture reading quizzes: A prelecture reading quiz will be available in canvas for each lecture class. The assignment will describe the reading to be completed before the next lecture and ask a few simple questions.

Problem Sets: Each chapter will have a problem set due two days after the last lecture of that material.

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.

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

Exams: There will be three 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 Wednesday, May 7th, 10:30 am – 1:00 pm.

Program Learning Outcomes:

ENVS PLO 2: Students will apply key concepts and principles in analytical chemistry including quantitative and instrumental analysis. ENVS PLO 2 is assessed in lecture using exams.

ENVS PLO 3: Students will use standard instrumentation and laboratory equipment to conduct scientific experiments and perform chemical characterization and analyses. Instruments assessed: GC, IR, UV-vis, HPLC, ICP. ENVS PLO 3 is assessed directly by faculty laboratory instructors' observation of students' use of instruments.

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. The final examination schedule is posted on the Traditional Undergraduate Records: Final Exam Schedules site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

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.

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 Spiritual Care*

PLNU strives to be a place where you grow as a whole person. To this end, we provide resources for our Graduate and Adult Undergraduate students to encounter God and grow in their Christian faith. We have onsite chaplains at our different campuses who may be available during class break times across the week. If you have questions or a desire to meet or share any prayer requests with our chaplains, you can find them at the Chaplain's Page via myPLNU.
In addition, the Mission Valley and Balboa campuses have a prayer chapel for use as a space set apart for quiet reflection and prayer.

PLNU Academic Honesty Policy

Students should demonstrate academic honesty by doinsg 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. For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See Adult Undergraduate Academic and General Policies for definitions of kinds of academic dishonesty and for further policy information.
During the first week of class, you will be asked to submit an Academic Honesty Verification Statement. Submitting the statement is a requirement of this course. By submitting the Academic Honesty Verification Statement, you will be verifying all assignments completed in this course were completed by you. Carefully review the Academic Honesty Statement below.

ATTENDANCE AND PARTICIPATION POLICY. Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university withdrawal date or, after that date, receive an "F" grade.

PLNU Recording Notification®

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel.
Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

Artificial Intelligence (AI) Policy

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc.) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.