

# Analytical Chemistry, CHE2013 Spring 2025

## 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.



Welcome to Analytical Chemistry! This is a 3 unit chemistry course, which includes both a lecture and laboratory component, taught by the Department of Chemistry at PLNU. This will be an opportunity to put many of the skills you learned throughout General Chemistry into practice as you explore the quantitative aspect of chemical analysis. I am excited to work with you this semester.

## INSTRUCTORS

Ariane Jansma, Ph.D.

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Kristen Ziebart, Ph.D.

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## OFFICE HOURS

Location: Rohr Science, 3<sup>rd</sup> floor Jansma Office

Directions: Enter through the Chemistry Department Office Suite (330)

Jansma Office is straight ahead as you enter the suite (334)

Mon, Wed, Fri	8:00 am – 9:30 am
Tues,	12:30 pm – 2:00 pm
Thurs.	8:00 am – 10:00 am

## LECTURE SCHEDULE

**Section 1:** Tuesday and Thursday 11:10 am – 12:30 pm

FINAL EXAM: Tuesday, May 6 at 10:30 am

Latter Hall 02

## LAB SCHEDULE

**Section 1:** Tuesday 8:00 – 11:00 am SA 221

**Section 2:** Tuesday 2:45 – 5:45 pm SA 221

## REQUIRED TEXTBOOK AND COURSE MATERIALS

- **Textbook\***: Daniel C. Harris, Quantitative Chemical Analysis, W.H. Freeman and Company, 10th edition 2016. ISBN-13: 9781319044053 (hard cover with Sapling code) or ISBN-13: 9781319044060 (loose leaf with Sapling code).
- **Online Homework**: Sapling Learning [www.saplinglearning.com/login](http://www.saplinglearning.com/login), bundled with textbook options
- Course Website: Canvas <https://canvas.pointloma.edu/courses/77445>
- Scientific Calculator
- Laptop or Device able to run Excel
- Lab Coat and Goggles, may be purchased during first laboratory meeting

## OPTIONAL MATERIAL

- Daniel C. Harris, Solution Manual for Quantitative Chemical Analysis, W.H. Freeman and Company, 9th edition 2016. ISBN-13: 9781464175633.

## COURSE DESCRIPTION

Examination of the theories and techniques of quantitative chemical analysis, with some emphasis on instrumental methods. Classical methods such as gravimetry, titrimetry, spectroscopy, electrochemistry, and chromatography will be discussed and used.

## LEARNING OUTCOMES

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

- Evaluate analytical data by determining error and uncertainty and using statistical methods such as the F test, t test, paired t test, and Q test.
- Solve equilibrium problems related to precipitation, acid-base, complexation, and oxidation-reduction reactions.
- Understand the concepts of various gravimetric methods such as precipitation, volatilization, and particulate gravimetry.
- Explain the principles of titrimetric methods including acid-base, complexometric, redox, and precipitation titrations.
- Understand the concepts of various spectroscopic and electrochemical methods.
- Perform analytical laboratory techniques related to the topics listed above.

## PREREQUISITE

General Chemistry II, CHE1053

## COREQUISITE

Analytical Chemistry Lab, CHE2013L (separate syllabus specific to lab)

**EVALUATION:**

The activities described below will contribute to your total course grade according to the following:

Lecture Midterm Examinations (3)	45%
Homework (Achieve)	10%
Pre-Class/Canvas Assignments	10%
Lecture Final Examination	15%
Laboratory Work	20%

Letter grades will be assigned at the end of the course according to the following scale:

	<b>A</b> 93 – 100%	<b>A-</b> 90 – 92.9%
<b>B+</b> 87 – 89.9 %	<b>B</b> 83 – 86.9 %	<b>B-</b> 80 – 82.9 %
<b>C+</b> 77 – 79.9 %	<b>C</b> 73 – 76.9 %	<b>C-</b> 70 – 72.9 %
<b>D+</b> 67 – 69.9 %	<b>D</b> 63 – 66.9 %	<b>D-</b> 60 – 62.9 %
<b>F</b> < 59.9 %		

**PLNU 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.

**ONLINE HOMEWORK**

Homework will be assigned regularly through **MacMillan Learning** which is accessible through Canvas.

**PRE-CLASS ASSIGNMENTS and IN-CLASS ACTIVITIES**

Pre-class assessments and in-class activities will be assigned in Canvas.

**EXAMS**

Three lecture midterm exams and a lecture final exam will be given during the course. Make-up exams will be arranged for the midterm exams only if the instructor is contacted prior to the scheduled exam time and then only if you present an institutionally valid excuse. There will be no make-ups or alternate day/times scheduled for the final exam unless 3 finals are scheduled for the same day, as per university policy.

**LECTURE AND LAB SCHEDULE**

The detailed lecture and lab schedule is available on the course website (Canvas).

**COURSE WEBSITE**

[Canvas](#) (CHE2013-SP25 – Analytical Chemistry) will be used constantly as a repository for all course material such as lecture notes, problem sets, etc.

## **LABORATORIES**

Attendance is mandatory at all laboratory sessions. If you must miss a lab for a university-accepted valid reason, you should make prior arrangements with the instructor to see if you can attend the other lab section. A lab absence will result in a zero on that lab report. Experiments will be performed either individually, with a partner, or in a group. Each partner/group member must keep a record of their work in their own laboratory notebook to submit individually. Each partner must independently weigh samples, carry out titrations, etc. They cannot work together by participating in a joint titration, etc., with one partner functioning as a guide/consultant. Each partner must report at least one determination in the final value. Separate, individual lab notebook pages or a formal lab report will be submitted by each student. Each lab grade will be based on lab notebook entries, the accuracy and precision of the quantitative unknown determinations, or formal lab report. Late labs will be penalized by deducting 5% for every day past the due date. See the Laboratory syllabus for additional details.

## **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.

## **SPIRITUAL CARE**

Please be aware PLNU strives to be a place where you 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 have prayer requests you can contact your professor or the Office of Spiritual Life and Formation.

## **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.

## **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.]

## **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.

## **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. For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

## **ARTIFICIAL INTELLIGENCE (AI) POLICY**

Use of any Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski) for work to be submitted for a grade is not permitted, and use of these tools will be treated as plagiarism and subject to the PLNU academic dishonesty policy. This will also hurt you in terms of exam preparedness so doing your own work will only help you.

## **PLNU ACADEMIC ACCOMMODATIONS POLICY**

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). 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 work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. The EAC makes accommodations available to professors at the student's request. 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. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes. 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. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any special accommodations.

## **LANGUAGE AND BELONGING**

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality. If you (or someone you know) have experienced a bias incident regarding language, you can find more information on reporting and resources at [www.pointloma.edu/bias](http://www.pointloma.edu/bias).

## **SEXUAL MISCONDUCT AND DISCRIMINATION**

In support of a safe learning environment, 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 accommodations and resources are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are 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](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix). If you (or someone you know) have experienced other forms of discrimination or bias, you can find more information on reporting and resources at [www.pointloma.edu/bias](http://www.pointloma.edu/bias)

## **LOMA WRITING CENTER**

The Loma Writing Center exists to help all members of the PLNU community cultivate transferable writing skills to engage their academic, professional, personal, and spiritual communities. We work toward this goal by conducting one-on-one consultation sessions, supporting writing education across the PLNU community, and participating in ongoing writing center research.

Getting feedback from the Loma Writing Center while you're in the process of working on an assignment is a great way to improve the quality of your writing and develop as a writer. You are encouraged to talk with a trained writing consultant about getting started on an assignment, organizing your ideas, finding and citing sources, revising, editing for grammar and polishing final drafts, and more. For information about how to make in-person or online appointments, see Loma Writing Center webpage or visit the Loma Writer Center on the first floor of the Ryan Library, room 221.

- Appointment Calendar: <https://plnu.mywconline.com/>
- Website: <https://www.pointloma.edu/centers-institutes/loma-writing-center>
- Email: [writingcenter@pointloma.edu](mailto:writingcenter@pointloma.edu)