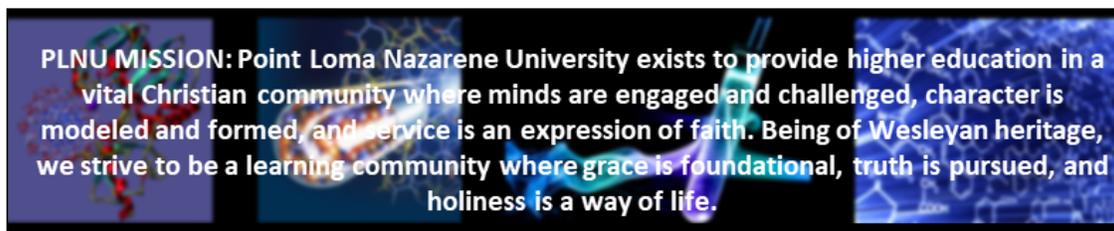


# ANALYTICAL CHEMISTRY (2013) SYLLABUS

## Spring 2022



This is a 3 unit chemistry course taught by the Department of Chemistry at PLNU involving 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. Analytical Chemistry provides an opportunity to apply many of the skills you learned in General Chemistry. We are really looking forward to guiding you through this exciting topic.

### INSTRUCTORS

Ariane Jansma, Ph.D. (Lecture)  
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Katherine Maloney, Ph.D. (Lab)  
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### First Week – Synchronous Zoom Session

Thursday (January 13): 11:05 am – 12:20 pm

[Click for Zoom Lecture Link](#)

### LECTURE SCHEDULE (Beginning Week 2)

**Section 1:** Tuesday and Thursday 11:05 am – 12:20 pm  
Latter Hall 02

### LAB SCHEDULE

<b>Section 1:</b> Tuesday	8:00 – 11:00 am	SA 221
<b>Section 2:</b> Tuesday	1:30 – 4:30 pm	SA 221

### OFFICE HOURS

Offered in a hybrid mode so you can come by any time in person or join via the following link:  
[Click to Join Office Hours Virtually](#)

Mon, Wed, Fri	11:00 am – 12:00 pm
Tues, Thurs	8:00 – 9:00 am
Tues, Thurs	10:00 am – 11:00 am

Additional times are available by appointment

**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).
- Laboratory Notebook and Lab Coat: \$15 and we will include a free lab coat if you need one – purchase with Dr. Maloney.
- **Online Homework:** Sapling Learning [www.saplinglearning.com/login](http://www.saplinglearning.com/login) (bundled with hard cover or loose leaf textbook or purchased separately for \$47 or with eText)
- Course Website: Canvas <https://canvas.pointloma.edu>
- Scientific Calculator
- Computer with Excel
- Laboratory Safety Glasses

**OPTIONAL MATERIAL:**

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

\* This textbook is also used for Instrumental Analysis (CHE370)

**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.

Program Learning Outcomes: ENVS PLO 2 will be assessed directly using the ACS Analytical Chemistry Exam.

**PREREQUISITE:** One year of General Chemistry

**COREQUISITE:** Analytical Chemistry Lab, CHE2013L

## EVALUATION:

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

Lecture Examinations (3)	36%
Homework	10%
Quizzes, Pre-Class Assignments, In-Class Activities	10%
Lecture Final Examination	14%
Laboratory Work	20%
Laboratory Final Examination	10%

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

A	90 – 100%
B	80 – 89%
C	70 – 79%
D	60 – 69%
NC/F	< 60%

(+) and (-) grades will be assigned within each bracket except there is no A+ grade.

## ATTENDANCE AND PARTICIPATION

You are responsible for all the material and announcements covered during lecture and lab. Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See [Class Attendance](#) in the Undergraduate Academic Catalog.

## ONLINE HOMEWORK

Homework will be assigned regularly through Sapling Learning ([www.saplinglearning.com/login](http://www.saplinglearning.com/login) course ID: **cwxytf**). Go to [Sapling Registration](#) for instructions on how to enroll in the course site. Sapling's technical support team can be reached by phone or this [webform](#). Successful completion of homework is essential in mastering the course material.

## PRE-CLASS ASSIGNMENTS, IN-CLASS ACTIVITIES AND QUIZZES

Pre-class assignments and in-class activities will be assigned in Canvas. Quizzes will be given periodically throughout the course covering either the reading assignment or material already discussed in class. The lowest pre-class assignment, in-class activity or quiz score will be discarded when final grades are computed.

## EXAMS

Three lecture exams, a lecture final exam, and a laboratory final exam will be given during the course. Make-up exams will be arranged only if the instructor is contacted prior to the scheduled exam time and then only if you present an institutionally valid excuse.

## LABORATORIES

Attendance is mandatory at all laboratory sessions. If you must miss a lab for a 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 and lab quiz. 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. Lab quizzes will be given at the beginning of each new experiment, covering both the old and new experiments. Late labs will be penalized by deducting 5% for every day past the due date.

## COURSE WEBSITE

[Canvas](#) (CHE2013-SP22 – Analytical Chemistry) will be used constantly as a repository for all course material such as lecture notes, problem sets, etc.

## 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.

## 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 students have questions, a desire to meet with the chaplain or have prayer requests you can contact the [Office of Spiritual Development](#).

## 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.

## **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.

## **USE OF TECHNOLOGY**

In order to be successful in the online environment, you'll need to meet the minimum technology and system requirements; please refer to the [Technology and System Requirements](#) information. Additionally, students are required to have headphone speakers compatible with their computer available to use. If a student is in need of technological resources please contact [student-tech-request@pointloma.edu](mailto:student-tech-request@pointloma.edu). Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

## **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](mailto: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.