CHE 3025L: Chemical Thermodynamics and Kinetics Lab

Syllabus, Spring 2026, Jan. 12 – May 8

POINT 1902 LOMA
NAZARENE UNIVERSITY
Department of Chemistry

This is a lab course that accompanies the Thermodynamics semester of Physical Chemistry. The fundamental goals are to apply concepts you learn in lecture to the analysis of chemical data, to gain experience with specialized equipment and techniques, and to develop skills in formal scientific communication.

Course Description: Designed to accompany CHE 3025. Measurements of the thermodynamic properties of chemical systems. (1 unit)

Corequisite(s): CHE 3025 (lecture, graded separately)

Dr. Sam Stoneburner
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Email: sstonebu@pointloma.edu
Phone: 619-849-2788
Lecture location: Latter Hall 02

Section 1: MWF: 8:30 am – 9:35 pm
Final: Mon., May 4, 7:30 am – 10:00 am
Note: I am not allowed to offer makeup finals before the scheduled day and time. **Plan travel for after your final**.

Office Hours: 1:30-2:30pm MWF (drop-in), or by appointment. I will be available **many other times** throughout the week. You are welcome to come in any time my door is open, but most of my availability will be through my Google appointment calendar. You can also email me to schedule an appointment outside of the calendar, if needed. Any changes to drop-in hours be announced via Canvas.

Communication: I will post information and announcements via Canvas. You should activate notifications. When I am not available in my office, the best way to reach me is by email. I will attempt to respond within one business day.

Email me only from your PLNU email address. Emails sent from non-PLNU email addresses may be diverted to a spam folder instead of reaching my inbox

Required Materials:

- The required texts from CHE 3025. (Lab instructions will be provided on Canvas.)
- Safety glasses.
- A scientific or graphing calculator
- A computer and Microsoft Excel (not Google Sheets or LibreOffice Calc). You should have access to Microsoft Office 365 as a PLNU student.

About your professor: I am a computational chemist with a deep appreciation and respect for "wet lab" experimental chemistry. I have spent much more of my teaching career in lab than in lecture, which has given me considerable opportunity to share from my library of lab safety horror stories, including…

- How I was in the building at the University of Minnesota at the time of the infamous lab hood explosion of 2014 (and related thoughts on the relevance to chemistry of Edmund Burke's "Reflections on the Revolution in France").
- My mostly unsupervised summer with cadmium.
- Possibly second-hand accounts involving elemental sodium, uranium hexafluoride, and/or misused chemical solvents.

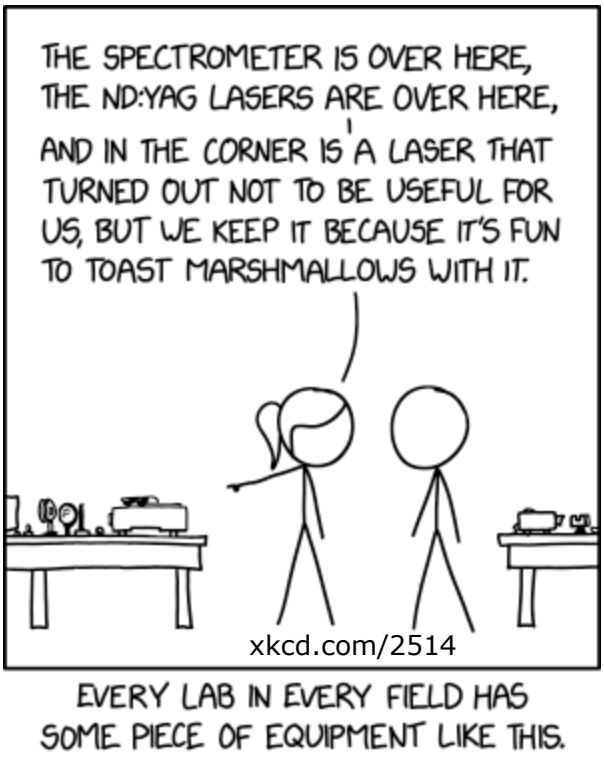
Course Learning Outcomes: Upon completion of this course, students will be able to:

- Identify relevant safety hazards or other concerns before beginning an experiment
- Apply appropriate safety precautions during an experiment
- Use equipment and instrumentation to measure chemical properties
- Use theoretical chemistry software to predict chemical properties
- Analyze and interpret data using professional software
- Communicate scientific ideas and results in writing using professional software
- Articulate limits and assumptions in experimental methodology and data analysis.

Safety:

Safety is THE top priority in the lab. You will be required to sign a safety agreement form before you can take part in the lab. The agreement form delineates safety rules set forth by the department. Make sure to review the full safety rules on Canvas, but note especially the dress code before coming in the first day:

- Long pants (pants that **fully** cover all skin down to the top of your shoes or socks)
- Shoes that cover the feet (closed-toed and closed-heel)
- Shirts that cover the shoulders, back, and stomach



Grading and Assessment

Letter grades will be assigned according to the following scheme after all scores are finalized. Any changes to these ranges will be only in your favor.

A-range	B-range	C-range	D-range	F-range
A: 93.00% or above.	B+: 87.00-89.99 %	C+: 77.00-79.99 %	D+: 67.00-69.99 %	F: Below 60.00%
	B: 83.00-86.99 %	C: 73.00-76.99 %	D: 63.00-66.99 %	
A–: 90.00-92.99 %	B–: 80.00-82.99 %	C–: 70.00-72.99 %	D–: 60.00-62.99 %	

Percent	Component
5 %	Tutorial writing activities (2)
5 %	Prelab safety quizzes (3, drop lowest 1)
15 %	Data Spreadsheets (3, drop lowest 1)
60 %	Lab reports (3 at 20% each, 2 submissions each)
15 %	Professionalism
100 %	Total

There is no final exam for CHE 3025L.

Each category is explained further in the subsections below.

Tutorial writing activities: CHE 3026L is a writing-instructive course. Formal scientific writing takes time, practice, and repetition, so there are some activities early in the semester designed to help you get ready for formal write-ups. There will be two activities: One to train you in preparing data and graphs, and one in which you will "grade" a set of AI-written components of a formal lab report.

Prelab quizzes: The first week of each experiment will have a quiz at the beginning to ensure you are familiar with the lab, the associated concepts from lecture, and any relevant safety risks. The quizzes will be closed-book, closed-notes, no-internet, but they will not involve complicated math. The quizzes will be at the start of lab.

Data: Physical chemistry experiments often require less time on the experiments, but much more time *after* the lab work for calculations and analysis. The schedule intentionally has a week after the experiment where we will meet to work through math and analysis, after which you will turn in your Excel spreadsheet with all of your results and calculations clearly labeled. These are individual and should not be identical between students.

Lab reports: The lab reports this semester are designed to help you learn to write at a professional level, as is appropriate for an upper-level course. Working in chemistry in any professional capacity will require creating written accounts of your work. If you are doing original research, this may involve peer-reviewed journal articles. If you are working for a business, you may be providing reports to your boss that may be used in patent applications or legal disputes. If you are working in health care, you will need to report on patient details with possible legal or life-threatening consequences if not done correctly. Regardless of the specific context, proper record-keeping and communication are of vital importance.

While you will work in groups, you will submit individual lab reports. You are permitted to discuss your reports with each other, but your work should be your own. Rubrics will be on Canvas beforehand with specific point assignments, which may vary somewhat among the three lab reports.

You will have two submission opportunities for each report. I will make comments on the first submission, and the second submission grade will fully replace the first submission, if higher. First and second submissions are graded independently of each other. It is possible I might catch something one the second submission that I missed on the first one. Be sure to pay careful attention to ALL aspects of the rubric on the second submission, not just the items that I flagged on the first submission

Professionalism

Most students in chemistry are planning to work in either a clinical or laboratory environment, where professional conduct can be a matter of life and death. (Students who show unprofessional behavior in med school have been shown to be more likely to have state board disciplinary action after they graduate.) Learning good habits early can give you the best chance at success in your career.

In the Physical Chemistry lab, "professionalism" includes the following categories:

- Did you arrive fully prepared to participate? For example…
  - Were you on time?
  - Did you read and understand the instructions?
  - Were you appropriately dressed?
- Did you comply with all safety requirements without needing reminders? For example…

- Did you wear eye protection until everyone was done with chemicals?
- Did you wear gloves (if needed)?
- Did you wear a mask if you were experiencing respiratory symptoms?

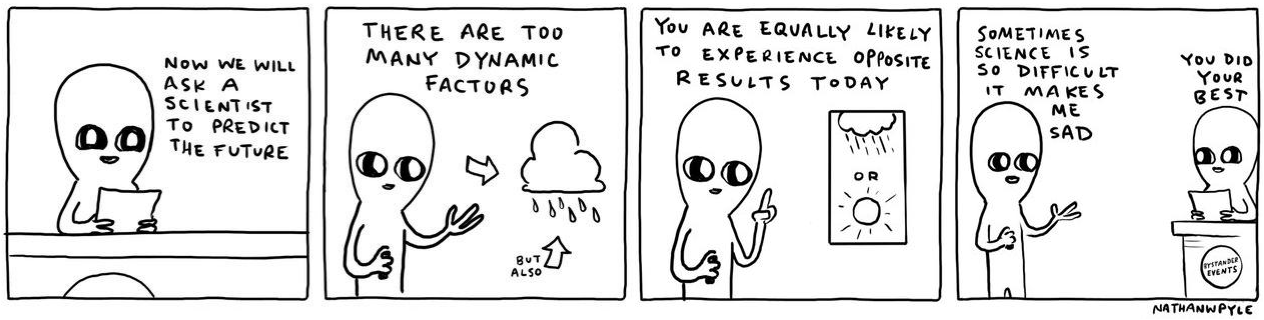
- Did you correctly clean and dispose of everything? For example…
  - Did you make sure any waste went in the appropriate container?
  - Did you clean all of your glassware?

You will be assessed each according to each of the three categories:

	Every week	−1 week	−2 weeks	−3 weeks	−4+ weeks
On time / prepared	105 pts	90 pts	70 pts	50 pts	0 points
Safety w/o reminders	105 pts	90 pts	70 pts	50 pts	0 points
Cleaning / disposal	105 pts	90 pts	70 pts	50 pts	0 points

Your professionalism grade is an average of the three scores above, and you can get extra credit if your professionalism is consistently good throughout the semester.

Schedule and time requirements: The PLNU Credit Hour Policy states that 2 hours of preparation per 3 hours of lab time is "normal", meaning almost **2.5 hours per week** (besides the 3.5 hours scheduled for lab itself) would be reasonable for the CHE3025L lab course. On the weeks that you do not have a required lab meeting, that is effectively **an extra 5+ hours** that can be used for preparation, analysis, and writing. I have also done my best to schedule lab deadlines to overlap as little as possible with exams and other major deadlines for the lecture course, although the end of the semester is inherently more busy. We have lab capacity limitations for some equipment, so within each section you will be split into two groups ("A" and "B"). "A" and "B" groups will meet on alternating weeks for experimental work, but will meet together for workshops and analysis. Group assignments will be on Canvas.



Additional Notes and Policies

Late assignments, extensions, and makeups: All assignments are to be submitted/turned in by the due date/time, including assignments posted in Canvas. Assignments will not receive credit for late work unless arrangements have been made with the instructor, but feel free to ask for extensions. I am usually willing to give extensions, but requests must be made in advance if at all possible, and they will be considered on a case-by-case basis. I especially encourage you to ask for extensions if you need them in the last few weeks of class, where the end of the semester forces the schedule to be tighter in a variety of ways. If you need an extension on an assignment, email me and **suggest a specific new (extended) deadline** that you believe would meet your needs.

Making up labs is not always possible, but talk with me as soon as you become aware of any possible scheduling conflict.

PLNU Attendance and Participation Policy:
Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. In keeping with PLNU policy, if the student is absent for more than 10 percent of class sessions (i.e., 1 absence for this course), the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent (i.e., 2 absences for this course), the student may be de-enrolled without notice until the course withdrawal date or, after that date, receive an "F" grade. Note that ALL absences are counted toward this total, including "excused" absences. Absences do not count towards this total if they are made up.

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. Academic dishonesty also includes submitting work done in a previous semester or for a different class as if it was completed for the class in question. 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:

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc) **ONLY** to generate ideas and computer code. You are not allowed to use AI tools (e.g., ChatGPT, iA Writer, Marmot, Botowski, GrammarlyGo, Perplexity, etc.) to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course, including drafting, editing, or final submissions. This course is designed to assess your independent critical thinking, writing, and research skills without the assistance of AI technologies. Violations of this policy will be treated as breaches of academic integrity. If you have any doubts about using AI, please gain permission from the instructor.

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
- Website
- Email: writingcenter@pointloma.edu

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 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 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 619-849-2533). 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. Professors are able to view a student's approved accommodations through Accommodate.

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 accommodations.

Note that the "hands-on" nature of the lab class limits how accommodations can be applied without fundamentally altering the academic standards of the course. Please discuss the specific accommodations you are interested in applying to this course with the lab coordinator as early as possible.

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 other forms of discrimination, you can find more information on reporting and resources at www.pointloma.edu/nondiscrimination.

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. 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 or find a list of campus pastors at 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

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 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 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.

Schedule:

This schedule is accurate as of the posting of this syllabus.
Canvas will have the most up-to-date information.

Date	Lab	Experiment	Groups	Room
Tue, Jan 13 Thu, Jan 15	0	Math workshop	A & B	S116
Tue, Jan 20 Thu, Jan 22	1-1A	Bomb Calorimetry, Part 1	A	S208
Sun, Jan 25		Writing Tutorial 1 (1st submission) due		
Tue, Jan 27 Thu, Jan 29	1-1B	Bomb Calorimetry, Part 1	B	S208
Sun, Feb 1		Writing Tutorial 1 (2nd submission) due		
Tue, Feb 3 Thu, Feb 5	1-2A	Bomb Calorimetry, Part 2	A	S208
Sun, Feb 8	Writing Tutorial 2 (1st submission) due			
Tue, Feb 10 Thu, Feb 12	1-2B	Bomb Calorimetry, Part 2	B	S208

Date	Lab	Experiment	Groups	Room
Sun, Feb 15	Writing Tutorial 2 (2nd submission) due			
Tue, Feb 17 Thu, Feb 19	1-3	Bomb Calorimetry, Analysis	A & B	S116
Sun, Feb 22	Exp. 1 Data due			
Tue, Feb 24 Thu, Feb 26	2-1A	Trouton's Rule (gas/liquid curve)	A	S208
Tue, Mar 3 Thu, Mar 5	2-1B	Trouton's Rule (gas/liquid curve)	B	S208
Fri, Mar 6	Exp 1 Report (1st submission) due			
Tue, Mar 10 Thu, Mar 12	No lab (Spring Break)			
Tue, Mar 17 Thu, Mar 19	2-2	Trouton's Rule, Analysis	A & B	S116
Sun, Mar 22	Exp 2 Data Due			
Tue, Mar 24 Thu, Mar 26	2-3	No lab (analysis and writing)		
Sun, Mar 29	Exp 1 Report (2nd submission) due			
Tue, Mar 31 Thu, Apr 2	No lab (Easter Recess)			
Tue, Apr 7 Thu, Apr 9	3-1A	UV-vis Kinetics	A	S208
Sun, Apr 12	Exp 2 Report (1st submission) due			
Tue, Apr 14 Thu, Apr 16	3-1B	UV-vis Kinetics	B	S208
Sun, Apr 19	Exp 2 Report (2nd submission) due			
Tue, Apr 21 Thu, Apr 23	3-2	UV-vis Kinetics, Analysis	A & B	S116
Sun, Apr 26	Exp 3 Data Due			
Tue, Apr 28 Thu, Apr 30	3-3	No lab (analysis and writing)		
Fri, May 1	Exp 3 Report (1st submission) due			
Fri, May 8	Exp 3 Report (2nd submission) due			