

# CHE3025-L

## Chemical Thermodynamics and Kinetics Lab

### Syllabus, Spring 2025, Jan. 13 – May 11



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.

**Dr. Samuel Stoneburner, Assistant Professor**

**Office:** Rohr Science 322 (enter through 330)

**Email:** sstonebu@pointloma.edu

**Phone:** 619-849-2788

**Lab location:** Sator Hall 208

**Section 1:** T: 8:00 am – 11:30 am

**Section 2:** R: 8:00 am – 11:30 am

**Section 3:** R: 1:30 pm – 5:00 pm

**Drop-in Office Hours\*:**

Mondays, 1:15pm – 2:15pm

Tuesdays, 12:30pm – 3:30pm

Wednesdays, 1:00pm – 2:30pm

Thursdays, 12:00pm – 1:00pm

Fridays, 12:15pm – 2:45pm

**Final:** There is no final for this lab course.

\* You do not need an appointment to meet with me during my Drop-in Office Hours. I am often available at other times, so if you would like to meet outside of those hours, email me to schedule an appointment.

**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.

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

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

**Required Materials:**

- The required texts from CHE 3025. (Lab-specific 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.

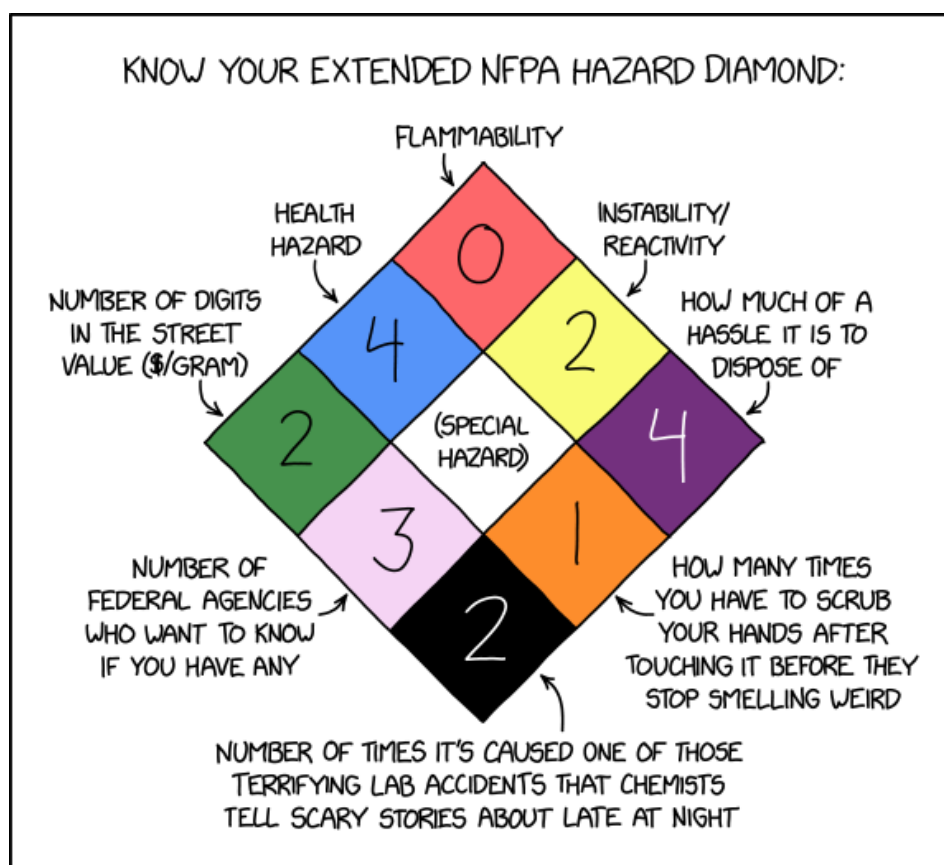
**About your professor:** I am a computational chemist with a deep appreciation and respect for “wet lab” experimental chemistry. I have spent much more of my teaching career in lab than in lecture, which has given me considerable opportunity to share from my library of lab safety horror stories, including...

- 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, you 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. Please note the requirement for long pants (a department-wide rule). Other rules will be posted on Canvas. If you fail to comply with these or *any* of the rules in the safety agreement, you may be excluded from the lab and will not have the opportunity to make up missed assignments.



xkcd.com/2639 With most labs, the hushed horror stories are about something like dimethylmercury or prions, but occasionally you'll get a weird lab where it's about the soda machine or the drop ceiling.

### ***Grading and Assessment***

Minimum letter grades will be assigned according to the following scheme:

<b>A-range</b>	<b>B-range</b>	<b>C-range</b>	<b>D-range</b>	<b>F-range</b>
A: Any grade of 93.00% or above.	B+: 87.00-89.99 %	C+: 77.00-79.99 %	D+: 67.00-69.99 %	F: Any grade below 60.00% <i>or 2 absences</i>
	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 %	

<b>Percent</b>	<b>Component</b>
15 %	Tutorial writing activities
10 %	Prelab quizzes (3 at 5% each, drop lowest one)
15 %	Data (3 at 5% each)
60 %	Lab reports (3 at 20% each)
	Professionalism modifier: A multiplier applied at the end of the semester
100 %	Total

***Changes to individual student grades*** outside of the course grading scheme would be ***unethical*** and ***should not be requested***. Do not ask for “extra credit”, “curving”, “rounding up” of the final grade, dropping of additional assignment scores, or any other changes to the grade, as this would constitute an ***unfair advantage*** over other students. The only acceptable basis for changing grades after they have been posted is to correct errors in grading or in the recording of the grades.

**Tutorial writing activities:** CHE 3025L 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 the lab reports.

**Prelab quizzes:** Each lab 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 begin immediately at the section start time, so don't be late.

**Data:** Physical chemistry experiments often require less time in the lab itself than other chemistry courses, but much more time *after* the lab period 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.

Rubrics will be on Canvas beforehand with specific point assignments. You will make individual submissions, but working together with your group (or others) is allowed and encouraged. Your submissions will go through Turnitin. It is expected that there will be similarities between different students' spreadsheet files, but that ***they will not be identical***.

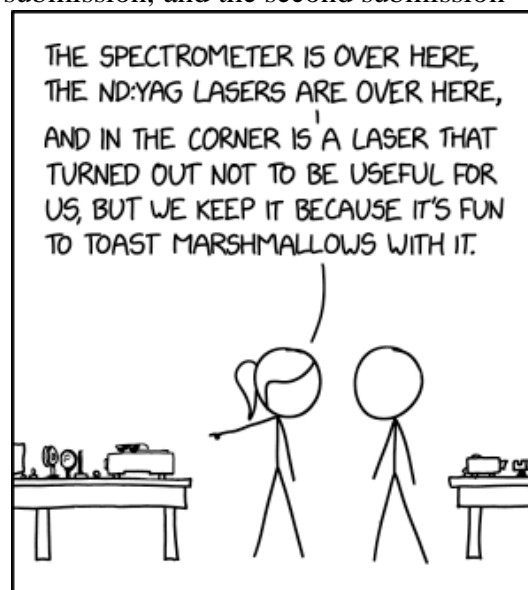
**Lab reports:** The lab reports this semester are designed to help you learn to write at a professional level, as is appropriate for an upper-level course. Working in chemistry in any professional capacity will require creating written accounts of your work. If you are doing original research, this 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. Your submissions will go through Turnitin and will be reviewed for possible plagiarism. 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.

**Professionalism modifier:** Grades may go up or down substantially based on compliance with course policies and general lab citizenship. *It is possible to fail this course solely on poor conduct*, although that would require pervasive patterns of problematic behavior.

Some of the most important skills you practice in a chemistry lab are also the most broadly applicable. In just about any workplace, you need to...

- Follow applicable **safety** rules and dress codes.
- Keep your working area **clean** (even if the meaning of “clean” varies).
- Show up **on time** and prepared, and complete your work on time.
- Do your **fair share** of any group- or team-based tasks.
- Be **respectful** of others and show appropriate deference to supervisors.



EVERY LAB IN EVERY FIELD HAS  
SOME PIECE OF EQUIPMENT LIKE THIS.

[xkcd.com/2514](http://xkcd.com/2514)

You will be assessed according to the following rubric after the first experiment (which takes place in two parts) and at the end of the semester. At the end of the semester, your grade will be multiplied by your professionalism score (as a percent). If you get 100, your grade will stay the same. If you get a score above 100 (the maximum is 120), your grade will go up. If you get a score below 100, your grade will go down.

Canvas does not have a system for an overall multiplier changing the grade as a whole, so the professionalism modifier will be applied after all other grades are in. While you will see results of your professionalism assessments in Canvas, you will NOT see your overall grade changed until the end of the semester. Expect to see your grade go up or down (depending on your professionalism score) after all other grades are posted.

**Rubric for the professionalism modifier:** There are 110 possible points. A score of 100 does not change your grade. A score above 100 will raise your grade, while a score below 100 will lower your grade.

Do you dress in FULL compliance with the dress code?	Always (10 pts)	Almost always (7 pts)	Sometimes (4 pts)	Unreliable (0 pts)
Have you ever been sent home to change?	Never (10 pts)	Once (7 pts)	Twice (4 pts)	More than twice (0 pts)
Do you wear all required PPE* without reminders?	Always (10 pts)	Almost always (7 pts)	Sometimes (4 pts)	Unreliable (0 pts)
Do you follow all other safety rules without reminders?	Always (10 pts)	Almost always (7 pts)	Sometimes (4 pts)	Unreliable (0 pts)
Have you ever attended lab with respiratory symptoms and NOT worn a mask?	Never (10 pts)	Once (7 pts)	Twice (4 pts)	More than twice (0 pts)
Have you ever been dismissive or argumentative when reminded of safety requirements?	Never (10 pts)	Once (7 pts)	Twice (4 pts)	More than twice (0 pts)
Do you dispose of chemicals properly?	Always (10 pts)	Almost always (7 pts)	Sometimes (4 pts)	Unreliable (0 pts)
Do you clean all glassware and equipment properly?	Always (10 pts)	Almost always (7 pts)	Sometimes (4 pts)	Unreliable (0 pts)
Do you arrive on time?	Always (10 pts)	Usually (7 pts)	Sometimes (4 pts)	Never (0 pts)
Do you do your fair share of cleanup tasks?	Always (10 pts)	Almost always (7 pts)	Sometimes (4 pts)	Unreliable (0 pts)
Have you ever behaved inappropriately to the instructor, to staff, or to other students?	Never (10 pts)	Once (7 pts)	Twice (4 pts)	More than twice (0 pts)

**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-plus 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.

**Incomplete grades:** Requests for Incomplete grades (where missing work or exams are completed the following semester) are evaluated on a case-by-case basis and hold strictly to [university policy](#), which allows Incompletes “only on the basis of extraordinary circumstances clearly beyond the student’s control.” Below are some examples:

Possible justifications for an Incomplete

- Official PLNU athletic conflicts
- Concussions or similar head injuries
- Chronic medical conditions
- A death in the family

Definitely would not justify an Incomplete

- Non-PLNU competitions
- Church trips
- Weddings or vacations
- Anything involving pets

### ***Additional Notes and Policies***

**Incomplete or late assignments and extensions:** All assignments are to be submitted/turned in by the due date/time, including assignments posted in Canvas. You are responsible for making sure that your submission is complete and legible *in Canvas* (i.e., “corrupted” files will not be accepted).

Late work will generally not receive credit. However, if you experience an emergency close to the deadline that causes you to miss an assignment, communicate with me as early as possible and an extension may be granted.

I am usually willing to give extensions for major writing assignments, 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.***

**PLNU Attendance and participation policy:** Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. According to the [university attendance policy](#), if the student is absent for more than 10 percent of class sessions (i.e., one absence for CHE 3025L), the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent (i.e., two absences for CHE 3025L), the student may be de-enrolled without notice until the course withdrawal date or, after that date, receive an “F”.

There is no way to make up a missed lab after the fact. I have no desire to give anyone a “0” for attendance, but we also face serious logistical constraints that prevent “make-up” labs from being an automatic possibility. As specified in the PLNU student handbook, “Activities of a unique nature, such as labs... cannot be made up except in rare instances when instructors have given ***advanced***, written approval for doing so.” (emphasis mine) If you know in advance that you have a scheduling conflict, speak with me as far in advance as possible about attending a different section. Capacity limits are a significant issue for the experimental weeks, and you are expected ([by university policy](#)) to attend your registered section if at all possible, so requests to attend alternative lab sections should be reserved for demonstrable necessities.

**Technology:** The use of portable electronic devices (phones, laptops, iPads, etc.) for purposes related to the course is welcome. Using technology for unrelated purposes during class time is detrimental to your learning and to those around you. Below are some examples:

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#### Acceptable uses of technology in class

- Taking notes
- Viewing lecture slides
- Looking up reference data
- Submitting assignments

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#### Unacceptable uses of technology in class

- Shopping
- Watching Tiktok
- Watching the World Cup
- Doing work for other courses

Using technology to “multitask” during lab time is detrimental to your learning and inconsiderate to those around you. It is also a violation of [PLNU’s academic behavior policy](#) (see below). Repeatedly engaging in irrelevant activity may result in your being asked to leave the class, with a corresponding penalty to your grade. If you have time-sensitive need, such as registering for courses or scheduling an appointment, speak with me beforehand and reasonable accommodations will be made.

PLNU’s course-information website, Canvas (<http://canvas.pointloma.edu>), is used as a repository for course material such as grades and miscellaneous items. **Announcements will be sent out via Canvas. It is your responsibility to check Canvas regularly and to confirm that your correct email address is in the system.** Also, be prepared to interact with me via your pointloma.edu email address. This means regularly checking your school email. Emails sent from non-PLNU email addresses may be diverted to a spam folder instead of reaching my inbox.

**PLNU academic behavior policy:** Both faculty and students at Point Loma Nazarene University have the right to expect a safe and ordered environment for learning. Any student behavior that is disruptive or threatening is a serious affront to Point Loma Nazarene University as a learning community. Students who fail to adhere to appropriate academic behavioral standards may be subject to discipline. In the context of our course, good behavior includes being present in class (mentally as well as physically), actively participating in group work, and asking questions when you need help or clarification. See [Academic Policies](#) in the online PLNU catalog for additional definitions of different kinds of disruptive behavior and for further policy information.

**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](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, I am 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)

### **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.

You may report an incident(s) using the [Bias Incident Reporting Form](#).

### **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.

### **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 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 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.



**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](#).

**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 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.

There are a wide range of possible ways to slip into dishonesty when reporting experimental work. Citations are especially important in the context of formal scientific writing. Even something as simple as failing to cite the lab instructions when describing your experimental methods can be problematic. I urge you to clear any uncertainty with me before submitting assignments. I am happy to help you think through the subtleties of proper credit.

For written assignments, I strongly recommend keeping a backup set of files that show your draft history. These can be used to demonstrate authorship if questions of academic honesty arise.

**Artificial Intelligence (AI) Policy:** You are allowed to use Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski, etc.) in this course. Any work that utilizes AI-based tools must be clearly identified as such, including the specific tool(s) used. For example, if you use ChatGPT, you must cite ChatGPT including the version number, year, month and day of the query and the statement "Generated using OpenAI. <https://chat.openai.com/>".

*Disclaimer: AI has a bad history with scientific details, and you are fully responsible for the accuracy of anything you submit in this course.*