# CHE3025L, Physical Chemistry I LAB
# Syllabus, Spring 2023, Jan. 10 – May. 5

This is a lab course that accompanies the first 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 improve in formal scientific communication.

**Dr. Samuel Stoneburner, Assistant Professor**
**Office:** Rohr Science 322 (enter through 330)
**Email:** sstonebu@pointloma.edu
**Phone:** 619-849-7230

**Lecture location:** Sator Hall 208
Section 1: 8:00 am – 11:30 am
Section 2: 1:30 pm – 5:00 pm
(Alternating groups in each section, see below)

**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.

**Drop-in Hours:** MWF, 1:00 pm – 2:30 pm, Thursdays, 9:30 am – 11:00 am
You do not need an appointment to meet with me during any of the above hours.
If you would like to meet me outside of the above hours, email me to schedule an appointment.
Please provide suggested meeting times between 9am and 4pm.

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

**Course Description:** An inquiry-based laboratory that is a co-requisite for CHE 3025.

**Required Materials:**

- The required texts from CHE 3025. (Lab-specific instructions will be provided on Canvas.)
- Lab coat
- Lab goggles, not glasses. I recommend Honeywell Uvex Flex Seal, model S3405X.
- 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:** Dr. Stoneburner is a computational chemist with a deep appreciation and respect for "wet lab" experimental chemistry. At last count, he has spent much more of his teaching career in lab than in lecture, which has given him considerable opportunity to share from his disturbingly large library of lab safety horror stories. Expect to hear about how he was in the building at the University of Minnesota at the time of the infamous lab hood explosion of 2014, his (mostly) unsupervised summer with cadmium, Edmund Burke's "Reflections on the Revolution in France", and possibly second-hand accounts involving elemental sodium, uranium hexafluoride, and/or misused chemical solvents.

**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.

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

- Identify any 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 appropriate software
- Communicate scientific ideas and results in writing using appropriate software
- Articulate limits and assumptions in experimental methodology and data analysis.

CHEM PLO 2 (UV-vis) and BCHM PLO 3 (UV-vis) will be assessed directly by faculty laboratory instructors' observation of students' use of instruments.

**Safety:** Safety is THE top priority in the lab. We will be working with some especially dangerous chemicals at nonstandard pressures. Please note the requirement for long pants (a department-wide rule) and for goggles (not glasses) that seal around the face. 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.

## *Grading and Assessment*

Letter grades will be assigned according to the following scheme:

| A-range | B-range | C-range | D-range | F-range |
|---|---|---|---|---|
| A: Any grade of 93.0% or above. | B+: 87.0-89.9 % | C+: 77.0-79.9 % | D+: 67.0-69.9 % | F: Any grade below 60.0% |
| | B: 83.0-86.9 % | C: 73.0-76.9 % | D: 63.0-66.9 % | |
| A–: 90.0-92.9 % | B–: 80.0-82.9 % | C–: 70.0-72.9 % | D–: 60.0-62.9 % | |

| Percent | Component |
|---|---|
| 20 % | Prelabs |
| 10 % | (each) Lab reports 1-4 |
| 20 % | (each) Lab reports 5-6 |
| * | Lab safety observations |
| 100 % | Total |

*Penalties may be applied to lab report grades if safety violations occur

- "Extra credit", "curving", or "rounding up" of the final grade should not be expected or requested. The only way to achieve a given grade is to perform well on the assignments described here.
- "Points" will vary in significance depending on the total number of points available in a given component.
- ***Late assignments will NOT be accepted.***

**Prelabs:** Lab doesn't start when you walk in the door; lab starts a week beforehand as you prepare. Each lab will have an assignment designed to ensure you are familiar with the lab, the associated concepts from lecture, and any relevant safety risks. In the interest of keeping everyone safe, and to give me time to review your submission, you must complete the prelab by 11:59 pm the night before.

**Lab reports:** While you will work in groups, you will submit individual lab reports. The ultimate goal is for you to be able to write up a lab in a formal manner that includes all of the major components that could be expected in a peer-reviewed published article. However, you will *not* be required to write anything so involved for all 6 lab reports. You will start with relatively simple reports and gradually add components in each report, which is why reports for Labs 1-4 count for half as much as Labs 5-6.

Here is a general breakdown of what will be required for which lab. More specific instructions and rubrics will be provided on Canvas.

| | Lab 1 | Lab 2 | Lab 3 | Lab 4 | Lab 5 | Lab 6 |
|---|---|---|---|---|---|---|
| % of grade | 10% of overall | 10% of overall | 10% of overall | 10% of overall | 20% of overall | 20% of overall |
| Abstract | N/A | 20% of Lab 2 | N/A | N/A | N/A | 10% of Lab 6 |
| Introduction | N/A | N/A | N/A | 40% of Lab 4 | 25% of Lab 5 | 20% of Lab 6 |
| Methods | 30% of Lab 1 | 20% of Lab 2 | 20% of Lab 3 | N/A | 10% of Lab 5 | 10% of Lab 6 |
| Results & discussion | 60% of Lab 1 | 50% of Lab 2 | 50% of Lab 3 | 50% of Lab 4 | 40% of Lab 5 | 40% of Lab 6 |
| Conclusion | N/A | N/A | 20% of Lab 3 | N/A | 15% of Lab 5 | 10% of Lab 6 |
| Formatting & grammar | 5% of Lab 1 | 5% of Lab 2 | 5% of Lab 3 | 5% of Lab 4 | 5% of Lab 5 | 5% of Lab 6 |
| Informal reflection | 5% of Lab 1 | 5% of Lab 2 | 5% of Lab 3 | 5% of Lab 4 | 5% of Lab 5 | 5% of Lab 6 |

**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 lab itself) would be reasonable for the CHE3025L lab course. Realistically, it will take much more than that for all of the data processing and write-up, which is why you will usually have lab on *alternating* weeks. The "off" week effectively provides an extra 5-plus hours intended for analysis and writing.

We also have lab capacity limitations, so within each section you will be split into two groups ("A" and "B"). On a typical week, roughly half of you will be in lab, while the other half will be in their off week. Group assignments will be on Canvas.

**Attendance:** Regular and punctual attendance at all classes is essential for learning, and lab classes are participation-based. Being late, leaving before completing your work (including cleanup and disposal), or coming to lab without having completed the mandatory pre-lab activity will be counted as an unexcused absence.

The PLNU attendance policy includes several specific points that are relevant for our lab. If the student is absent for more than 10 percent of class sessions (i.e., 1 absence), the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent (i.e., 2 or more absences) by the last day to drop (March 24), the student may be de-enrolled without notice. If a student has a third absence **after** that deadline, they may receive a W or WF, depending on their work and participation up to that point. **There are no allowed or excused absences except** as approved in writing by the Provost for specific students participating in certain university-sanctioned activities (e.g., a student athlete who cannot attend due to a scheduled game). These are the **only** absences that do not count towards the 20 percent absence threshold.

If you are truly unable to attend, please let me know as soon as you become aware of the problem. 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.

**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 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 should have this discussion even if they were using the same accommodations in the previous semester. Students should be aware that not all accommodations can be applied to the chemistry lab in the same way as in many lecture courses.

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 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 chemistry lab courses, failure to comply with **any one** of the safety rules and policies may qualify as disruptive behavior.* See Academic Policies for additional definitions of different kinds of disruptive behavior and for further policy information.

**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.

In the context of a lab course, academic honesty does not mean that you have to cite your lab partners on every line on a data table. If you were assigned to work together, and you put their names on the lab report, it is already assumed that you all worked together to gather the data. However, if you were to use data from a different group, you would need to give them credit. Academic honesty *does* mean that you are not copying anything *other* than the raw data from your partner. It also means that you should not copy from a lab report that someone turned in for some previous semester, *even if that someone was you*. For added verification, all lab reports will be submitted to Canvas with Turnitin.

**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. Please be aware that under Title IX of the Education Amendments of 1972, **it is 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

**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.

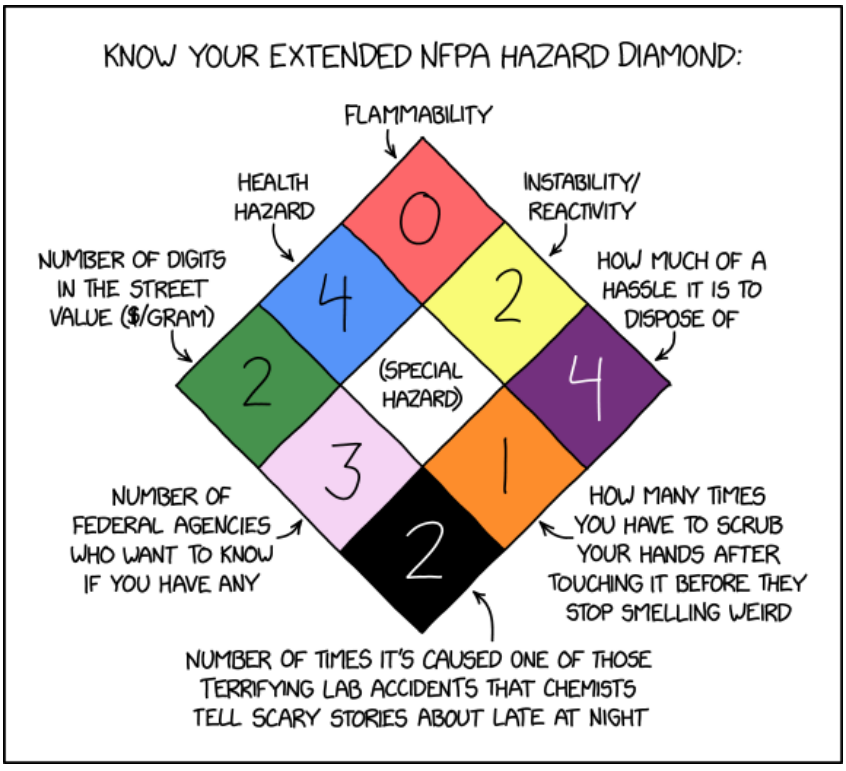
**State authorization:** State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) 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.

## CHE 3025L: Physical Chemistry I LAB: Tentative schedule

The schedule may change during the semester. Watch Canvas for updates.

| Lab | Group A | Group B | Report due dates (Wednesdays, 11:59pm) |
|---|---|---|---|
| No lab on Jan. 10 (Monday schedule) | | | |
| 0: Math supplement | Jan. 17 | | N/A |
| 1: Joule-Thompson coefficient | Jan. 24 | Jan. 31 | Feb. 15 |
| 2: Bomb calorimetry | Feb. 7 | Feb. 14 | Mar. 1 |
| 3: Gas-phase reaction | Feb. 21 | Feb. 28 | Mar. 15 |
| No lab on Mar. 7 (Spring break) | | | |
| 4: Vander Waals isotherms | Mar. 14, optional Mar. 21* | | Apr. 5 |
| 5: Speed of sound | Mar. 28 | Apr. 4 | Apr. 19 |
| 6: Kinetics | Apr. 11 | Apr. 18 | May 3 |
| No lab on Apr. 25 | | | |

*Lab 4 is a dry lab, so Groups A and B will meet together (location TBA). There may be an optional meeting the following week on Mar. 21, but there is an exam in the lecture course on Mar. 22, so I am also trying to free you up to prepare for that.

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