

CHE 1053, General Chemistry II

Syllabus, Spring 2023, Jan. 10 – May. 5



This is a 3 unit chemistry course taught by the Department of Chemistry at PLNU. Chemistry is a fundamental building block of life since every physiological process ultimately involves chemical reactions. Throughout this semester, I strongly encourage you to review class work regularly, practice problems daily and ask as many questions as necessary in order to succeed. Talk to me one-on-one early and often; helping students like you discover this field is my favorite part of my job.

Dr. Samuel Stoneburner, Assistant Professor

Office: Rohr Science 322 (enter through 330)

Email: sstonebu@pointloma.edu

Phone: 619-849-7230

Lecture location: Latter Hall 1 (LA 1)

Section 4: MWF: 11:00 am – 11:55 am

Final: Wed., May 3, 4:30 pm – 7:00 pm

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, please email me to schedule an appointment.

Please provide suggested meeting times between 9am and 4pm.

Course Description: Study of the basic principles of modern chemistry. Emphasis on atomic and molecular structure, chemical bonding, gas laws, states of matter, and solutions.

Prerequisite(s): CHE 1052

Necessary, but not a formal prerequisite: Math skills equivalent to those taught in pre-calculus.

Corequisite(s): CHE 1053L (lab, graded separately)

Course Materials:

- *Textbook:* Tro, Chemistry: A Molecular Approach Plus Modified MasteringChemistry with eText, Pearson, 5th Edition, ISBN-13: 9780135748626 (hardcover text), 9780135748763 (looseleaf text), or 9780134989884 (etext)
- *Online Homework:* MasteringChemistry www.masteringchemistry.com (bundled with text or purchased separately) Course ID: beauvais89835
- *Scientific Calculator:* **Non-graphing, non-programmable** calculator required for exams and quizzes. (Acceptable models include, but are not limited to, a TI-30XIIS or a Casio FX-115ES.)
 - Business or accounting calculators, such as the TI-30XIIB, are *not* recommended.
- *iClicker2 Student Remote:* ISBN-13: 9781498603041 (or a [subscription to the app](#)).

About your professor: Dr. Stoneburner earned his associate's degree while renovating a local hardware store, his bachelor's degree while acting in minor roles in college theatre, and his doctorate while getting married and adopting four children. His hobbies include PC gaming (mainly single-player RPGs). It has never been proven that he attempted to steal the moon in order to take over the entire Tri-State Area, but even if he did do that, everything changed when the fire nation attacked and he took an arrow to the knee.

PLNU Mission: To Teach ~ To Shape ~ To Send

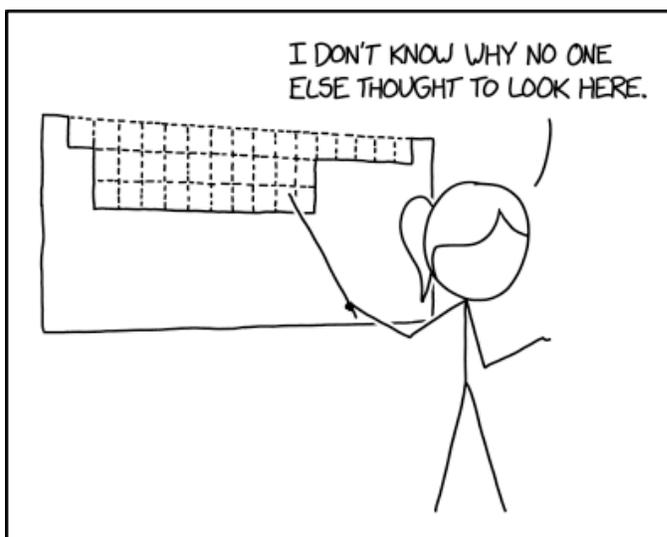
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Foundational Explorations Mission:

PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and culture.

Course Learning Outcomes: An understanding of chemistry is a necessary part of an education in the basic and applied sciences, engineering, and medical professions. It also provides insight and increased comprehension regarding current events and proposed policies. Specifically, upon completion of this course, students will be able to:

- Demonstrate a foundational knowledge of the general principles of chemistry including the behavior of solutions, the characteristics of equilibrium (including acid/base equilibrium), the significance of free energy, the properties of electrochemistry, and structures of transition metal and their compounds.
- Solve problems related to describing basic chemical kinetics, characterizing reaction equilibrium, predicting the direction of spontaneous change, calculating electrochemical cell potentials and writing chemical equations for selected chemical reactions.
- Perform basic chemical laboratory techniques related to the topics listed above (CHE1053L).



THE 2019 NOBEL PRIZE IN CHEMISTRY WENT TO THE TEAM THAT DISCOVERED THE ELEMENTS IN THE BIG GAP AT THE TOP OF THE PERIODIC TABLE.

Academic success: Learning chemistry will require significant effort from all of us. Merely attending lecture will not be enough. Merely reading the textbook will not be enough. Merely completing the assigned homework as a rote exercise will not be enough. You need to *understand* the course material and be able to apply it in new situations. You will be shown concepts, ideals, problem-solving strategies, and examples, but in the end you should be able to use what you have learned in a much wider range of situations than the ones considered in class. Here are some tips to help you get there:

Before each class:

Read the assigned chapter sections and make notes of anything that is confusing or difficult.

Do any assigned prelecture work in Mastering Chemistry and complete the Canvas reading survey.

During each class:

Have your notes from the pre-lecture reading handy. Some questions may be answered (hopefully) throughout the lecture. Ask questions to clarify anything that remains confusing.

After each class:

Look over the textbook again, especially the parts that seemed difficult before. Look over previous textbook sections as much as needed to reinforce relevant ideas and connections.

Attempt assigned homework as early as possible. This will give you more time to come in to office hours or ask questions over email as much as needed.

After you have completed assigned work, **keep going**. Do additional problems from the end of each chapter and check your answers in Appendix III or with Dr. Stoneburner.

Don't stop practicing when you get it right; keep practicing until you can't get it wrong.

I am aware that you have other demands on your time, but this is what it will take to master General Chemistry. The PLNU Credit Hour Policy states that **2 hours of preparation per 1 hour of class time is "normal", meaning 6.5 hours per week (besides lecture itself)** for the CHE 1053 lecture course. If you find chemistry intimidating or find yourself struggling to keep up, you may need additional time. There should be no shame in that. If you put the time in, and do so usefully, you will probably understand chemistry much better than the student who seems to get all the right answers in the first few minutes of trying.

You can maximize the effectiveness of your time by giving yourself a focused environment. Do not try to "multitask" with videos or social media while you are working on chemistry. ("Multitask" is a word that here means "doing a poor job of multiple tasks simultaneously". That is what "multitask" *always* means.) I also recommend caution when consulting other resources on the internet. There is an abundance of misinformation online, much of it intentional.

Most of all, know that I am here to help, and your asking me questions early and often goes a long way towards making sure your precious time is spent as productively as possible. I want to see you succeed, and I look forward to participating in that success.

Grading and Assessment

“The risk I took was calculated, but man, am I bad at math.” – The Mincing Mockingbird

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
15 %	Mastering Chemistry online assignments
5 %	Participation: Clickers (3%) and Reading Surveys (2%)
5 %	Christian practices
5 %	Quizzes
50 %	4 Exams (12.5% each)
20 %	Final Exam
100 %	Total

Important notes:

- “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. Do not ask for “extra” work to boost your grade.
- “Points” will vary in significance depending on the total number of points available in a given component. In other words, 2 points on an exam may not have the same effect on your grade as 2 points on a quiz. Total points in a given category may change during the semester (e.g., if a quiz is added or dropped), but the percentage contributions given in the chart above will remain the same.
- Canvas will NOT have many of the current scores throughout the semester (other than Exams), so ***the Canvas total percentage is NOT a reliable indicator*** of your current performance. You can use the “What-If” tool in Canvas to obtain estimated grades, and you are welcome to request clarification as to your current status at any time.

Participation: Throughout most lectures there will be questions involving responses using your **iClicker remotes**. Your participation grade will be based on how many questions you answer, **not** how many questions you get correct. During lecture, it is okay to take a chance on being wrong (whether in iClicker responses or in asking questions) so long as you try to learn from the experience. Finding out you misunderstand something during class may help you avoid repeating that misunderstanding in an exam. Additionally, for each class period with a reading assignment there will be a **survey** on Canvas (due 8:00 am on that lecture day). The survey will typically have an open-ended question designed to highlight a key point in the reading and a place to put down two questions you had ***about the reading***. Credit is based on whether you respond, not on whether you get a “right” answer.

Mastering Chemistry online homework (Course ID: beauvais89835): The Mastering Chemistry content includes assigned homework problems as well as pre-lecture activities. Practicing what you are learning both before and after attending lecture is the most active (and most effective) part of your efforts in the course. Due dates will be found within the Mastering Chemistry system, *not on Canvas*. The deadlines for assignments will generally be:

Pre-lecture activities: 8am on Mondays, Wednesdays, and Fridays

Homework problem sets: 11:59pm on Mondays, Wednesdays, and Fridays (occasionally on Tuesdays and/or Thursdays just before an exam)..

If you find yourself struggling with a problem repeatedly (e.g., 5 wrong answers to the same problem), you should come to my office hours and ask for help. I recommend you use a notebook for working out solutions to homework problems. Using a notebook creates a written record that you can consult later as you study or seek assistance, and it can be beneficial in the event of academic integrity questions. A notebook with your work on previous attempts to a problem is especially helpful when you are asking for my assistance.

After completing the assigned work, you can find additional practice in the end-of-chapter problems in the textbook. Doing so is *strongly* recommended and I am happy to help you with any questions that may come from any of those problems.

Christian practices: It may not be obvious how Christian identity can overlap with the study of natural sciences. While that will come up from time to time in lecture, one of the most important aspects is community. This assignment is designed to demonstrate the importance of community and the Christian practice of love of neighbor during our studies.

You will be assigned to a group at the beginning of the semester and you will be asked to pray for members of the group throughout the semester. You will meet as a group at least three times during the semester, with the first meeting occurring in the first two weeks of class. (If your group decides to make your group a chemistry study group and meet more often, you are welcome to do so, but it is not a requirement of this assignment.)

You will be required to fill out a log that includes the times you met as a group, the times you have prayed for group members, as well as times that you have encouraged a classmate or helped them in some way. ***Do not include personal or private information such as prayer requests.*** You will hand this log in at the end of the semester and will be required to have at least 10 entries *in addition* to the three group meetings. In addition, you will be required to write a brief reflection on the overall assignment. This assignment is worth 100 points. 80 points are for the log, and 20 points for the reflection.

While PLNU is explicitly Christian in its identity, you are not required to be. Community has uniquely Christian expression, but it is not a uniquely Christian priority. You are free to replace the “prayer” component with some other mindful exercise that is compatible with your beliefs, so long as it is focused on the specific members of your group. You should still complete a log and reflection.

Quizzes: There will be quizzes roughly once per week covering content from the most recent few lectures. The day of the week and the delivery method (e.g., in-class vs. online) may vary. The quizzes will help you assess your understanding of the material, especially as you are preparing for exams. Look at them as additional opportunities to identify areas where you need my help or additional practice before your next exam. Note that you must use scientific (non-graphing, non-programmable) calculators on all quizzes and exams.

Exams: Exam days are on the course schedule at the end of the syllabus. Exams will not be moved outside of truly extraordinary circumstances. Make-up exams will generally not be offered unless you get my permission before the exam *and* you must miss the scheduled exam time due to illness or similar circumstances beyond your control. Note that you must use scientific (non-graphing, non-programmable) calculators on all quizzes and exams.

Final Exam: The final exam will be on Wednesday, May 3rd, 4:30pm-7:00pm. PLNU policy is that the final exam is required and that it must be given at the scheduled time. ***No change of final exam schedule will be approved for CHEM 1053.*** Travel arrangements are *not* a valid reason to request a change to the final exam.

Additional Notes and Policies

“Good men don't need rules. Today is not the day to find out why I have so many.” – Doctor Who

Incompletes and late assignments: All assignments are to be submitted/turned in by the beginning of the class session when they are due, including all work on Mastering Chemistry and any assignments posted in Canvas. Late work will not receive credit. Incompletes will only be assigned in extremely unusual circumstances. Quizzes and exams will not have make-up opportunities without my prior approval (see “Exams” under “Grading and Assessment” for more details).

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 (i.e., 5 or more absences), the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent (i.e., 9 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.

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.

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

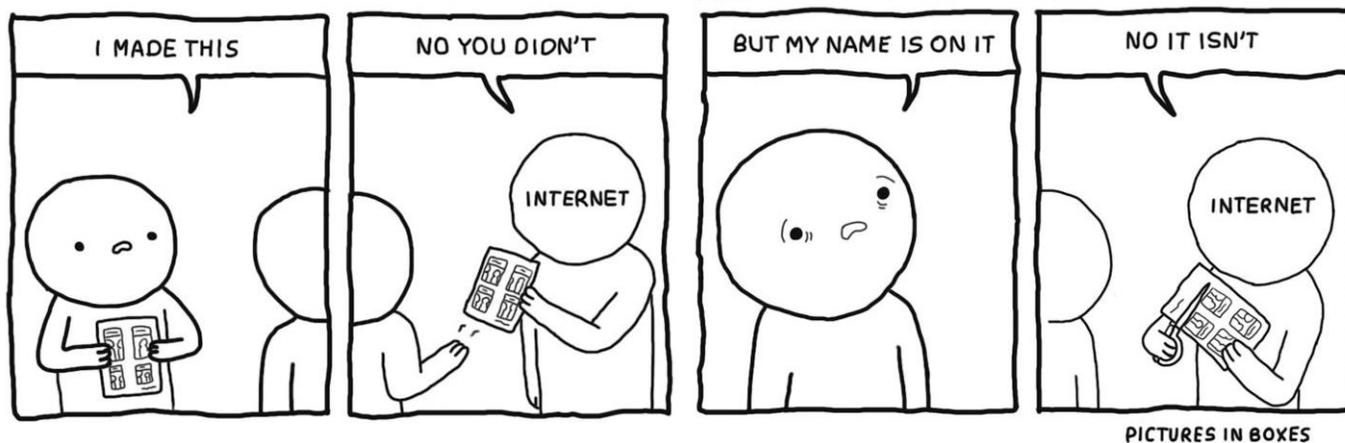
PLNU academic accommodations policy

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 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 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.



(Ironically, it took me a long time to find a copy of this comic that hadn't had the author's name deleted.)

CHE 3025: Physical Chemistry I: Tentative schedule

The schedule may change during the semester. Watch Canvas for updates. Almost all class days have reading surveys and pre-lecture assignments due 8am and homework assignments that are due 11:59pm.

Day	Topics	Pre-Read	Lab
T Jan 10	Properties of Solutions	14.1-14.2; 14.5	Monday sections meet on Fri, Jan 13
W Jan 11	Factors Affecting Solubility	14.3-14.4	
F Jan 13	Colligative Properties	14.6-14.7	
M Jan 16	<i>No class due to Martin Luther King, Jr Day</i>		
W Jan 18	Colligative Properties	14.6-14.7	1: Freezing Point Depression
F Jan 20	Reaction Rates (last day to add)	15.1-15.3	
M Jan 23	Integrated Rate Law and Effect of Temperature	15.4-15.5	2: Kinetics: Reaction Rates.
W Jan 25	Collision Theory and Reaction Mechanisms	15.5-15.6	
F Jan 27	Catalysis	15.7	
M Jan 30	Exam Review	—	3: Kinetics: Arrhenius
W Feb 1	EXAM 1: Ch. 14-15	—	
F Feb 3	Principles of Chemical Equilibrium	16.1-16.5	4: Solution Equilibrium
M Feb 6	Equilibrium Calculations	16.6-16.7	
W Feb 8	Equilibrium Calculations & Le Chatelier's Principle	16.8-16.9	
F Feb 10	Le Chatelier's Principle	16.9	

Day	Topics	Pre-Read	Lab
M Feb 13	Finish 16 & Start 17	16/17	5: Le Châtelier's Principle
W Feb 15	Nature of Acid and Base	17.1-17.4	
F Feb 17	pH Calculations and Acid/Base Strength	17.5-17.6	
M Feb 20	Bases, Salts, and Polyprotic Acids	17.7-17.9	6: Alkaline Water
W Feb 22	Acids Strength and Molecular Structure	17.10-17.11	
F Feb 24	EXAM 2: Ch. 16-17	—	
M Feb 27	Common Ions and Buffers	18.1-18.3	7: K_a of a Weak Acid
W Mar 1	Titration Principles	18.4	
F Mar 3	pH Curves and Indicators	18.4	
Mar 6-10: No class due to Spring Break		—	
M Mar 13	Solubility Equilibria	18.5-18.6	8: K_{sp} of Calcium Iodate
W Mar 15	Complex Ion Equilibria	18.7-18.8	
F Mar 17	Spontaneity, Entropy, and 2nd Law	19.1-19.3	
M Mar 20	Free Energy – The Concept	19.4-19.5	9: Qualitative Analysis of TM Cations
W Mar 22	Free Energy and Chemical Reactions	19.6-19.7	
F Mar 24	Free Energy and the Equilibrium Constant (last day to drop)	19.8-19.10	
M Mar 27	Exam Review	—	10: Indirect Calorimetry
W Mar 29	EXAM 3: Ch. 18-19	—	
F Mar 31	Half Reactions and Balancing	20.1-20.2	
M Apr 3	Cell Potential and Free Energy	20.3-20.5	11: Electrochemistry (M,T)
W Apr 5	Cell Potential and Concentration Effects	20.6-20.7	
F Apr 7	Apr 6-10: No class due to Easter Recess	—	
M Apr 10	Apr 6-10: No class due to Easter Recess	—	11: Electrochemistry (W,R)
W Apr 12	Electrolysis and Corrosion	20.8-20.9	
F Apr 14	Coordination Compounds and Isomers	26.1-26.4	
M Apr 17	Metal-Ligand Bonding and “d” Orbitals	26.5-26.6	12: Ligand Field Theory
W Apr 19	Metal-Ligand Bonding and “d” Orbitals	26.5-26.6	
F Apr 21	Nuclear Chemistry	21.3-21.6	
M Apr 24	Nuclear Chemistry	21.3-21.6	13: QA of Main-Group Cations
W Apr 26	EXAM 4: Ch. 20, 21, 26	—	
F Apr 28	Final Exam Review	—	
W May 3	COMPREHENSIVE FINAL EXAM: Ch. 1-21, 26 Wednesday 4:30 – 7:00 pm (See Final Exam Schedule)	—	No Lab