Chemistry 101: General Chemistry I

Syllabus (Lecture Section 16919; Lab Section 16920)

Spring 2025, Los Angeles Valley College

Instructor: Dr. Arno Papazyan
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LABS:	Mondays, Wednesdays	9:00 am – 12:10 pm	AHS 341
LECTURE CONTACT HOURS:	Mondays	3:30 pm – 6:05 pm	Zoom
	Wednesdays	3:30 pm – 6:05 pm	Zoom
OFFICE HOURS:	Mondays	1:30 pm – 2:30 pm	Zoom
	Wednesdays	1:30 pm – 2:30 pm	Zoom

During "Lecture Contact hours" Zoom sessions, I will be going over practice questions on the recent topics. You can participate in solving the questions in real time, when your schedule allows. However, the sessions will be recorded and will be available under Canvas.

"Office hours" are meant to be a block of time when you can join the Zoom session and ask any questions and we can go over concepts and solve problems.

The day and time of Lecture Contact Hours and Office Hours may be changed during the semester.

PREREQUISITES: Math 125 and CHEM 060 or CHEM 068 with grades of C or better

IMPORTANT DEADLINES

Last date to drop with a refund/no fee owed: February 23, 2025
Last date to enroll with a permission number: February 23, 2025
Last date to drop this class without a "W": February 23, 2025
Last date to drop with a "W": May 11, 2025

COURSE DESCRIPTION

A study of chemical principles and laws with emphasis on chemical calculations. This course will cover chemical stoichiometry and concentration calculations, gas laws, thermochemistry, introductory quantum mechanics, bonding, molecular geometry, unit cell calculations, and colligative properties. Laboratory work includes gravimetric analysis, titration, and observation. This course is required of majors in agriculture, bacteriology, biology, botany, chemistry, dentistry, engineering, geology, medical technology, medicine, optometry, pharmacy, and physics.

COURSE FORMAT AND DELIVERY

This is a hybrid course, with both on-campus (in-person) and online components. The on-campus component involves in-person labs, and students are required to attend every session. "Attendance" includes showing up to the lab **on time**. Quizzes and exams will be administered in the lab as well, during an on-campus lab period. **You must take the exams and quizzes at the scheduled place, date and time**.

The "lecture" component is done mainly asynchronously via posted materials on Canvas. However, we will have 3 hours and 10 minutes of live Zoom sessions per week during which you can come and participate in solving practice questions and benefit from discussions and guidance. In addition, we also have a total of two hours of office hours conducted via Zoom.

Learning management system used for the course is **Canvas**. It will host (or link to) all course materials and resources. You will submit lab reports using Canvas. To access Canvas, please either use Canvas Login or Student Portal Login . If you have trouble logging in, please contact Student Portal Help or Virtual Valley. And here are some useful topics covering Online Student Readiness Tutorials.

REQUIRED/RECOMMENDED MATERIALS AND TOOLS

- The textbook for the course is "General Chemistry: Principles and Modern Applications", 11th edition, by Petrucci (ISBN: 9780132931281).
    - We will not be using any online homework system by the publisher.
    - You do not need to buy the textbook from the college bookstore.
    - An inexpensive used copy or textbook rental is fine.
- Laboratory notebook sold by the LAVC bookstore for this course.
- You will also need a simple scientific calculator such as TI-30Xa.
- While you are not mandated to buy it, a simple molecular model set would be very useful, in obvious and less obvious ways.
- Because of the online component of this hybrid class, you need a digital device with a reliable internet connection.

STUDENTS WITH DISABILITIES

If you have a physical, psychiatric/emotional, medical, or learning disability that may affect your ability to carry out assigned course work, please contact the staff in Services for Students with Disabilities. They can be contacted by email at is **ssd@lavc.edu** or by phone at (818) 947-2681. SSD will review your concerns and determine, with you, what accommodations are appropriate. All information and documentation are confidential.

COURSE POLICIES

No-show policy (about being dropped in the first week!)

- If you are not present for the entirety of both lab sessions during the first week of classes, or if you do not take the Canvas quiz on the first week's introductory lecture that will be recorded and posted on Canvas, you will be regarded as "no show" and will be dropped from the course. If you cannot make it to a class meeting (or unable to take the online quiz for the first lecture session) during the first week, contact me before the session (preferably before the day of the session) and explain the reason for your absence.

- If you encountered connectivity problems or other unexpected challenges, please let me know as soon as it is feasible to do so.
- Unless reasonable, demonstrable, and documented causes are given by the student in a timely manner, a "no show" student will be dropped from the course.

Exclusion policy (about being dropped during the term)

- You are expected to attend every scheduled class/lab session at the scheduled time.
- **Being present less than 75% of the class time cumulatively during the term, or being present less than 50% of the class time during any given week** is cause for being dropped from the class. If there are exceptional circumstances that you can document, please let me know ahead of time if at all possible, or the same day as the class you missed at the latest. If your documented circumstances justify your absence, and the absences do not continue, you may be allowed to remain in class.
- **If your performance on the quizzes and exams indicate that you are not engaged with the course material, you can be dropped from the class**. In other words, being "present" in class (or Zoom session) is not sufficient to demonstrate a real student-course relationship if you are turning in exams that lack meaningful knowledge and skill about the material covered. For example, scoring regularly 20% or 25% on multiple-choice exams where questions have 5 choices corresponds to roughly what one would score based on pure chance, indicating a complete absence of knowledge relevant to the course. Of course, as long as you are asking for help, and demonstrating engagement but are struggling, that is completely different. I will do my very best to help you catch up and give you guidance and support and will keep you on the roster as long as you are trying.
- **Absence from more than two labs will cause you to fail the class** regardless of your quiz and exam scores. This is a "lab science course", and labs are an essential and non-negotiable part of it. It is accepted as a transferrable "lab science course" course by other institutions, in part, but fundamentally, due to the lab component. In order to avoid being counted as "absent" from a particular lab, you need to do all of the following:
    - Be present when we are covering the lab.
    - Display engagement and activity when we are performing the lab.
    - Turn in a lab report that contains your own original (not copied or plagiarized) work that is reasonably complete and correct. That means you cannot be counted as "present" by showing a token engagement but turning in a report that shows no meaningful knowledge or skill retained from the activity. Of course, if you need help with your report, feel free to ask for my help (as well as your peers). As long as you are trying and asking for help, I will make sure you have all you need to submit a report that is "reasonably complete and correct". In other words, in order to count as "present" you simply need to display a sincere effort for the entirety of the lab, including the preparation of the report.
- While you can expect to be dropped due to accumulated absences described above, **you should not rely on being dropped automatically**. Your circumstances may be regarded as too ambiguous to drop you from the class, for example. Or you might misjudge or miscalculate how much absence you accumulated and may still be in good standing on the deadline for withdrawing with a W. If you wish to receive a W and avoid an F, you should withdraw from the course before the deadline rather than rely on your lack of engagement to trigger an automatic drop by your instructor. Giving up on the course at some point does not mean that the attendance data on the deadline day justifies your being dropped by the instructor yet.

Although this "exclusion policy" section is detailed and long, I hope very much that it will be irrelevant for each and every student in my class. Ask for my help, advice, and guidance before you choose to give up on succeeding in the course.

Policy on expected behavior, including academic honesty

- Act respectfully, collegially, and ethically toward your peers as well as your professor.
- Use polite and appropriately respectful language when addressing the professor, in written correspondence as well as conducting yourself in person. A modicum of behavioral standards will be demanded of you, as is standard in any professional environment. Starting your email to your professor with “Hey” is probably never really appropriate regardless of how great your rapport is. I personally don't mind the informal approach. However, building the habit of erring on the side of politeness is wise.
- Also pay attention to the content of your messages (to anyone), not just the superficial appearance of politeness. Polite-sounding statements can nevertheless be hurtful and rude.

Students must read and understand the rules, expectations, and consequences of violating those, as described under “Policy on Academic Integrity” on p.208-211 of the Los Angeles Valley College catalog:

Los Angeles Valley College 2024-2025 Catalog

The rules will be strictly enforced and academic dishonesty in any form will not be tolerated. This includes, but is not limited to, cheating on exams, changing answers on assignments after submission, copying of lab reports, and falsification of lab data. If such dishonesty is discovered, all students involved will obtain an automatic zero on their assignment, be reported to the campus disciplinarian, and possibly receive an F grade in the course. A zero score obtained due to cheating will count towards your final grade – it cannot be substituted or dropped!

Homework and practice expectations

Homework is not graded. You should do homework to assure your success on the tests, not for any direct contribution to your grade. If you are able to successfully and independently answer the homework questions, you are virtually assured of success in the course. Work on the homework problems (and make sure you can come up with the correct answer for each question) to increase your chances of success, not because you will receive a few percentage points. As an absolute minimum, you should be able to solve (ultimately with no help or consultation) all the practice questions provided as well as many of the relevant problems from the end of chapters as possible. You shouldn’t expect to be able to answer questions fully without help at the beginning of your studying of a topic, but you should strive to do so ultimately, and before the test. If you can’t do that, you won’t be able to answer any similar test questions either.

For each chapter, Problem-Solving Handouts (containing relatively basic questions), Chapter Review Questions (containing more challenging questions), Practice Questions and Selected End-of-Chapter Questions are available to download from Canvas or links therein under each Chapter module.

Laboratory policies and expectations

Students must:

- take active part in the work with their lab partner(s),
- record their data individually in their laboratory notebook, according to the norms stated in the laboratory manual.
  - Not on some other piece of paper
  - Not on a digital device
- have their data pages (lab notebook or printed out report form of the experiment) signed by the instructor when they are done with the day’s experiment.
- do their own calculations,
- turn in an individual report for grading purposes

To work efficiently and meet the required deadline for turning in the lab reports, you must come to the lab session well prepared. This means:

- Read carefully (several times, if needed) the experiment (both Principles and Procedure) **prior to coming to the lab session.**
- **Understand the theoretical and conceptual basis of the experiment**.

If you are collaborating with another student, make sure your words and calculations are yours, you understand what you learned from someone else, performed the calculations yourself, and expressed your own thoughts. So, don't copy somebody else's work, and don't let others copy yours. Don't be surprised if you lose most or all of your lab grade as a result of participating in plagiarism.

The completed report needs to be submitted in digital form (scanned from paper that contains your handwritten work) on Canvas by the due date and time indicated on canvas.

A missing lab report will automatically count you as absent from the lab even if you performed the experiment.

Lab reports that are submitted late will be subject to score deductions of 10% for each day for the first five days. After the 5th day, the report will receive a zero.

Your submitted report will receive credit only if you performed the experiment.

If your work shows that you disregarded instructions during the lab, expect a significant reduction in the lab grade. You must be present in mind as well as body.

Your work must be submitted in the form of a single pdf file that includes all the pages, any extra sheets showing calculations if needed, any charts if needed. The pdf must be in portrait mode, and should not show your work sideways, upside-down, etc. You will lose a significant number of points if you do not follow these specifications.

Your work must be legible, organized, labelled, with enough description of your calculations to make it reasonably easy to follow. You must not expect your instructor to read your mind or do detective work to decipher what is in your report. What cannot be readily followed in your report form is graded as "incorrect". Make sure your work is conveyed clearly.

If you miss more than two labs before the "Last date to withdraw with a W" deadline, you will be dropped from the course. If you end up missing your third lab after the "Last date to withdraw with a W" deadline", you will not be dropped, but instead your lab average will be zero, as explained under the "Grading policy" section below. This is a "lab science course", and labs are an essential and integral part of it. Also, please remember that you are not entitled to be dropped automatically if you are no longer in good standing due to lack of attendance. It is your responsibility to withdraw from the course if you are unable to fulfill the commitment you made when you signed up for the course.

Policies on quizzes and exams

There are 3 quizzes and 3 midterm exams.

Quizzes and exams normally assess the newly covered topics since the last exam. The exact coverage of a quiz or exam may be different from what is listed on the schedule. If so, you will be informed about it.

Both quizzes and exams may include questions on any of the laboratory experiments conducted up to that point.

There are **no make-up exams or quizzes before or after the scheduled time of an exam or a quiz**. **Lowest exam score and lowest quiz score are dropped.** In other words, life's unexpected challenges are handled without relying on the instructor's subjective judgement. This setup also avoids the inequitable situation where a student takes a test that is different from the rest of the class or has more (or less) time than the

rest of the class to study. While no method could be perfect, this arrangement is meant to be the fairest way to address the challenges the students may face during the semester objectively.

The final exam is mandatory and cumulative. Therefore, it includes all the topics covered. It also includes lab-related questions. It has a hefty weight in determining your overall grade, and every student must take it (mandatory). Performance on the final can have a large impact on your ultimate letter grade.

There is **no make-up final** exam. Missing the final exam results in a final exam grade of zero.

Grading Policy

Quizzes, midterm exams, and the final exam ("tests") will be mostly multiple choice, but may also contain short-answer questions or questions that demand that you show your work. If there is an error in the answer key, the initial grades will be modified according to the correct answer key. Tests are given in multiple randomized and scrambled versions to different students. The same question will have different numbers, names, or chemicals in different versions (and will appear at different places in the test, with answer choices scrambled as well). Tests may be "curved", but that is by no means guaranteed.

Grades are not accumulated as points. Instead, the averages of various "assignment groups" (namely Quizzes, Exams, Lab Reports, and Final Exam) are added up according to their percentage weights. Assignments are generally graded out of 100 for simplicity (and not because they all have the same point value, which is meaningless in our grading scheme). The average for the Exams is calculated after the lowest one is dropped (this is done automatically by Canvas). The same is true for the Quizzes.

Some of the reasons you can lose points on lab work are explained under "Laboratory Policies and Expectations".

Lab grades assigned during the term are only "projected" grades and are not formally earned until you satisfy the lab attendance requirement by not missing more than two labs during the entire term. That is, each lab assignment is formally incomplete and can only earn the projected (assigned and shown) grade **after** you satisfy the lab attendance requirement at the end of the term. **If you miss more than two labs, all of your lab assignments remain incomplete and revert to zero.** If you miss more than two labs before the "Last date to withdraw with a W" deadline, you will be dropped from the course. If you end up missing your third lab after the "Last date to withdraw with a W" deadline", you will not be dropped, **but instead your lab average will be zero** because all of your lab assignments will remain incomplete due to the lab attendance requirement and the projected (conditionally assigned and shown) lab grades will revert to zero. That is obviously extremely undesirable.

Please do not think that you can neglect your responsibility to complete all the labs because you are doing well on the quizzes and exams.

The lab component is fundamental to this "lab science course", which is transferrable to other institutions because of the assumption that the student has completed the lab component. **Make sure you understand this policy** and satisfy the lab requirement sincerely and honestly, as **you agreed** to do when you signed up for this lab science course.

Obtaining a passing grade on the lab portion by attending the labs with no more than two absences and turning in reasonably complete and correct lab reports by their deadlines is a key requirement of this course. You can fail this course by failing the lab part even if you do well on the "lecture" part. Keep this in mind.

Below are the percent weights of all assignment groups:

Quizzes	15%
Exams	25%
Lab reports	35%
Final Exam	25%
Total	100%

Below are the letter-grade thresholds:

% Grade*	Letter Grade
90-100	A
80-89	B
66-79	C
56-65	D
0-55	F

* These cutoffs are applied after your average grade is rounded to the nearest integer. For example, 89.51 would be treated as 90 and would correspond to an A, while 89.49 would receive a B.

The lowest exam and the lowest quiz are dropped.

Possible mistakes in any assessments or assignment grades must be brought to your instructor's attention <u>on the same day as receiving the information that is being claimed to need correction</u>.

Letter grades are determined mathematically from the sum of your grades and are not negotiable. They represent your overall performance, *not* your needs, *not* your aspirations, and *not* how hard you worked. The only way to improve your letter grade is to improve your performance:

- by following the study advice I provided during the term, not after
- by asking for more detailed and personalized explanations of points that are unclear to you, again during the semester or session.

GROUND RULES, GUIDELINES, AND ADVICE

The kind of learning you must do in this class

PowerPoint slides and lectures are not meant to be mindlessly copied or memorized. Naturally, you might end up needing to memorize some terms, names and formulas if your practicing did not naturally commit them to your memory. But that should be relatively rare. You develop your depth and understanding by solving as many practice questions as possible, thus converting initially memorized items into acquired knowledge and master the thinking process involved. In fact, through practice you eliminate most, if not all, of the memorization. Numerous practice questions are supplied. When you find a practice question too difficult to answer or a concept too confusing, you <u>should</u> ask my help by email or during office hours. **<u>You</u>** are ultimately responsible for your success, even though I provide as much help and guidance as possible.

On study habits and style

<u>Don't focus on memorizing!</u>

Prepare for each class by reading appropriate sections of the book, going over the online documents and resources provided. You don't need to achieve a full and deep understanding at that point, but mainly an

exposure to the ideas and procedures to be covered. This will make it easier for you to spend more time in class listening, learning, and asking questions instead of just copying notes.

Memorizing examples and expecting very similar questions on the tests will not work well enough. Don't expect to leave the lecture (virtual or otherwise) with anything more than a passing familiarity with the subject. You haven't truly learned anything until you gain a lot of practice answering questions and solving problems.

Every individual is different, but it is generally recommended that you schedule **at least 3 hours every day** (7 days a week, not just on the days when there is class) to study, solve many problems, and complete the lab assignments. Increase the amount of time you dedicate if necessary.

You will learn best by struggling to solve them and by making mistakes. You must work through and master the problems by **yourself** to do well in this class. Following somebody else (solutions manual, instructor, tutor, friend, online videos, etc.) answering the questions is not enough, even if you feel that you follow and understand the logic. Again, you must solve problems **yourself**, and lots of them. You, your pencil, eraser, calculator, periodic table, and a list of constants that may be needed, against the question. Just like on a test. That is the only way you can actually learn.

If you find yourself coming up with "rules" and "shortcuts" that are nowhere to be found in the lectures, stop. Check with me to make sure the "shortcut" is actually reliable or valid.

If your answer to a question was incorrect the first time, re-try using the correct answer (from the key) as a guide. If you still cannot solve it, study the solution provided. Then put away any solutions, resources, etc. and restart from the beginning of the question. If you get stuck, repeat until you can solve the question from beginning to end. Then re-try answering the question the next day (or several hours if there is no time before a test) again from beginning to end.

You can't do well without solving a lot of problems. Practice questions, suggested problems from the book, and the examples solved in class are necessary for learning the concepts. But remember: they don't necessarily mimic the exam and quiz questions.

On the importance of sleep

While it is sometimes unavoidable to be sleep-deprived, you should make every effort to get enough sleep every night. "Enough" sleep varies from person to person, and 7-8 hours is reasonable. However, persistently getting only 6 hours of sleep will leave virtually anyone as sleep-deprived (as measured scientifically by performance on mental tasks) as not having slept at all the night before, but the 6-hours-of-sleep-a-night person will not be aware of the severity of the situation, and claim to "feel fine". However, lectures will sound impenetrable and meaningless and exam questions will look alien if you are suffering from sleep-deprivation (knowingly or unknowingly).

And don't study if you are sleepy. Cramming for an exam the night before is a bad idea under any circumstances, but doing that at the expense of your precious sleep is a very bad idea. As you get tired, hours will pass while you make 10 minutes' worth of progress. Those hours are much better spent getting the sleep your brain needs. Resume your study after you get your sleep.

Please don't ignore this.

STUDENT LEARNING OBJECTIVES:

1. Demonstrate an understanding of the fundamental principles of chemistry, including atomic and molecular structure, bonding, basic treatment of quantum theory, periodic properties, stoichiometry, gas laws, states of matter, and an introduction to solutions.
2. Write names and formulae of compounds and write and balance chemical equations.
3. Apply mathematics to solve quantitative chemical problems (amount of reactant to amount of product, and vice versa) involving gases, solutions, and the amount of energy a reaction produces or absorbs.
4. Balance oxidation-reduction equations using oxidation states of elements and the half-reaction method.
5. Apply basic quantum theory to determine the electron configuration and orbital diagram of all the elements (including the exceptions to the rule).
6. Determine the type of bonding in a compound, the shapes of molecules, the polarity of compounds, and their solubility in various solvents, and construct models of molecules with up to six bonds to a central atom.
7. Calculate the amount of heat transferred between two objects or during a reaction, the enthalpy of reaction from Hess' Law and enthalpy of formation, and the heat required for a substance to undergo one or more phase changes.
8. Analyze experimental data statistically, draw a scientific graph of the data, determine the mathematical relationship between the variables, assess the reliability of experimental results, and discuss the sources of systematic and random error in experiments.
9. Anticipate, recognize, and respond properly to hazards in laboratory procedures and managing chemical waste.
10. Perform accurate quantitative measurements, keep accurate and complete experimental records, interpret experimental results and draw reasonable conclusions, and communicate effectively through oral and written reports.
11. Maintain a clean, orderly, and safe lab space.

STUDENT LEARNING OUTCOME (expressed concisely):

Solve chemical problems involving gases, solutions, and energy.

SCHEDULE (The pace of covering the subjects in lectures will vary slightly in practice)

Any remaining time on Lab days will be used for Lecture/Practice

Week of		Monday Lab	Wednesday Lab	Topics to master
1	2/10/25	Introduction & Orientation Practice/Lecture	Safety training, Check-in Practice/Lecture	**Ch.1** Matter & Measurement **Ch.2** Atomic Theory **Ch.3** Chemical Compounds
2	2/17/25	Presidents' Day	*Lab: Balances* Scientific Calculator check and practice	Organic Nomenclature **Ch.4** Chemical Reactions
3	2/24/25	*Lab: Graphs* Lab Notebook check and practice	*Lab: Nickel (II) Salt (Part A)*	**Ch.4** Chemical Reactions **Ch.5** Reactions in Solutions
4	3/3/25	**Quiz 1 (Ch. 1-4)** *Lab: Nickel (II) Salt* (Part B)	**Exam 1 (Ch. 1-4)** *Lab: Nickel (II) Salt (Part C)*	**Ch.5** Reactions in Solutions **Ch.6** Gases
5	3/10/25	*Lab: Metathesis Reactions*	*Lab: Copper Chemistry and Redox Reactions* (Day 1)	**Ch.6** Gases
6	3/17/25	*Lab: Copper Chemistry and Redox Reactions* (Day 2)	*Redox Reactions (Copper Chemistry Part B)*	**Ch.6** Gases **Ch.7** Thermochemistry
7	3/24/25	*Lab: Determination of the Gas Constant*	*Lab: Molar Mass of a Volatile Liquid*	**Ch.7** Thermochemistry
8	3/31/25	**Cesar Chavez Day**	*Lab: Bomb Calorimetry*	**Ch.8** Electrons in Atoms
	4/7/25	**Spring Break**		
9	4/14/25	*Lab: Internal Energy Problems*	*Lab: Hess' Law of Heat Summation*	**Ch.8** Electrons in Atoms
10	4/21/25	**Quiz 2 (Ch. 5-7)** Practice/Lecture	**Exam 2 (Ch. 5-7)** Practice/Lecture	**Ch.9** Periodic Properties
11	4/28/25	*Lab: Atomic Emission Spectroscopy*	Practice/Lecture	**Ch.10** Chemical Bonding I
12	5/5/25	*Lab: Determination of % KHP* (Parts A & B)	*Lab: Determination of % KHP* (Part C)	**Ch.10** Chemical Bonding I
13	5/12/25	*Lab: Determination of % KHP* (Part D)	*Lab: Determination of % KHP* (Part E)	**Ch.11** Chemical Bonding II
14	5/19/25	*Lab: Molecular Models*	**Quiz 3 (Ch. 8-12)** *Lab: Vapor Pressure and Enthalpy of Vaporization*	**Ch.12** Intermolecular Forces
15	5/26/25	**Memorial Day**	**Exam 3 (Ch. 8-12)** Lab check-out	Review
16	6/2/25			
	6/9/25	**Final Exam** (includes everything covered) 9:30am-11:30am		