

# Chemistry 101: General Chemistry I

Course Syllabus (Lecture Section 16112; Lab Section 15867)

Fall 2021, Los Angeles Valley College

**Instructor:** Dr. Arno Papazyan

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**OFFICE HOURS:** Wednesdays : 10:20 am – 12:20 pm

**LABS:** Tuesdays, Thursdays 7:50 am – 11:00 am

**LECTURES:** Tuesdays, Thursdays 11:20 pm – 12:45 pm

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

## 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

The course is “Scheduled”. This means that you must attend the zoom sessions live, just as you would for an on-the-ground class. The Zoom sessions will be recorded and posted on Canvas. **Also, you must take the exams and quizzes at the scheduled date and time.**

Quizzes and exams will be proctored via Zoom. Students are required to have their Zoom video on, Zoom audio unmuted, and the audio of their device, i.e. speakers or headphones, muted during tests in order to avoid being distracted by the audio feed from Zoom.

The laboratory experiments will be “virtual”. The lab schedule is listed at the end of this syllabus.

Learning management system used for the course is **Canvas**. It will be used to host (or link to) all course materials and resources. Students will submit homework and lab reports using Canvas. Canvas will also be used for the mandatory safety quiz. However, while students will download their specific test versions at the beginning of regular quizzes and exams from Canvas, those tests will not be administered through Canvas (the details will be explained before the first quiz, and we will have a pretend quiz to make sure everyone is familiar with the process). 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 MATERIALS

1. Petrucci, General Chemistry: Principles and Modern Applications, plus MasteringChemistry w/ eText, 11<sup>th</sup> ed.
2. ISBN: 9780132931281 (bookstore)
3. Lab Manual, available to download on Canvas
4. Problem Solving Handouts, available to download on Canvas
5. Scientific Calculator (not graphing) such as Texas Instruments TI-30Xa

## HOW LEARNING HAPPENS – GENERAL PICTURE

### **Almost all of your actual learning occurs outside of lecture. Don't be shocked by this!**

PowerPoint slides and lectures are not meant to be mindlessly copied or memorized. Naturally, you may need to memorize some terms, names and formulas, but that is insufficient for achieving true learning. 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 on my website. When you find a practice question too difficult to answer or a concept too confusing, you should ask my help by email or during office hours. You are ultimately wholly responsible for your success, even though I provide as much help and guidance as possible.

Do not demand this course to be like a high school course. Not even an AP course.

Do not demand this course to be a training to “just solve the problems” and bypass understanding. The goal is not to memorize some tricks and procedures to just get the answers. Don't rely on “pattern recognition” to recognize a problem with a memorized recipe to be populated with the numbers you pick from the body of the problem you think you recognized. That will fail too often, and even when it works, it will prevent you from learning the concepts. You absolutely do need to be able to arrive at the correct answers, but through understanding what it is you are doing rather than applying some recipe you crammed or memorized. The conceptual understanding of what the problems are asking about is not fluff or unnecessary nonsense. **It is the reason the course exists.** Expecting your professor to help you avoid that understanding and “just get the answers” is not reasonable. That should not be your idea of good teaching or proper learning. What I am talking about here is not just about “doing the right thing”. The thinking skills and the healthy attitudes you acquire now will impact how qualified you will be as a professional as well as an informed, thinking citizen. And collectively it will determine the quality of the people carrying our civilization into the future.

## STUDY HABITS AND STRATEGIES

### Don't focus on memorizing!

Prepare for each class by reading appropriate sections of the book, going over the slides posted online, and 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. Mindless copying of "rules" and examples is not note-taking, and memorizing those is not learning. Actual understanding of the concepts and applying them to new questions are key to success. 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.

### "Homework"

Every individual is different, but it is generally recommended that you schedule **at least 2 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. Don't relax just because you have a few days between today's class and the next one. Use the intervening days to get better at the subject. Don't relax just because the next quiz or exam is not near. You need to keep up with the coverage whether you are being tested very soon or not. Diligently work through all the suggested homework problems and practice questions (available on the class website), and then do some more. **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.

**Here is a piece of advice you will probably ignore. But you shouldn't.**

## **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.**

**But you probably will ....** 😞

## **EXPECTED BEHAVIOR AND CONSEQUENCES OF NOT MEETING THEM**

- 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. If your professor raises an eyebrow in response to being aggressively yelled “that doesn’t make sense”, he is not making faces or being condescending; he is being polite and tolerant. Phrase your questions politely. And starting your email with “Hey” is probably never really appropriate regardless of how great your rapport with him is. Err on the side of politeness.
- Also pay attention to the content of your message, not just the superficial appearance of politeness. Thoughtlessly accusing your professor of unfairness is one of the rudest and hurtful things you can do in your interaction with him, especially because he takes pride in doing things in the fairest, most ethical, compassionate, and considerate way possible.
- By all means, after a thoughtful self-reflection, if you still feel you are treated unfairly in some way, you should certainly contact your professor and attempt to resolve the issue. There is a very good chance the issue will be resolved with a good explanation or a remedy.

Obviously, cheating and any other similar conduct violating the academic code of conduct will not be tolerated, and will be treated according to guidelines contained in the code. 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 2021-2022 Catalog \(lavc.edu\)](http://lavc.edu)

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!

## **STATEMENT ON ANTI-DISCRIMINATION:**

Title IX (of the 1972 Education Amendments) protects you and staff alike from discrimination based on sex, including sexual harassment and sexual assault, which are forms of sexual misconduct. Under Title IX, all people in the educational environment must be treated equitably, regardless of sex, sexual orientation or expression, and/or transgender identity. If you have experienced or learned of a possible violation of Title IX and/or would like to know about options, resources (including confidential services), the law, or District policy, please do not hesitate to contact LAVC’s Title IX Coordinator: Elizabeth Negrete (818) 947-2702, [negreteme@lavc.edu](mailto:negreteme@lavc.edu), [TitleIXCompliance@lavc.edu](mailto:TitleIXCompliance@lavc.edu). District Title IX Office: Office for Diversity, Equity, and Inclusion (213) 891-2315, [TitleIX@email.laccd.edu](mailto:TitleIX@email.laccd.edu)

## EXAMS and QUIZZES

There are 4 quizzes and 4 midterm exams.

Quizzes normally assess the newly covered topics since the last exam. The exact coverage of a quiz will be announced at an appropriate time before the quiz.

A given midterm exam will emphasize the recently covered topics, but it may also probe earlier topics that are not part of the foundation of the recent material. Recently covered topics that an exam will emphasize will be announced at an appropriate time before each exam. Tests may include questions on laboratory experiments.

**Quizzes and exams will be delivered online during a scheduled lecture period and are not “flexible”.** They will be proctored over Zoom, using video and audio. Please make sure you have a video-capable device for taking the quizzes and exams.

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 at the end of the semester.** 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.

### FINAL EXAM

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). Poor performance on the final can easily lower your grade by one letter grade (A to B, B to C, for example) and an excellent performance can raise it by a letter grade.

**Final exam will be delivered online.** It will be proctored over Zoom, using video and audio. Please make sure you have a video-capable device to take the final exam. The exact time and date of the final exam will be determined during the semester and the class schedule will be updated accordingly.

There is **no make-up final** exam. **Missing the final exam results in a final exam grade of zero and results in a “fail” in the course.**

## **HOMEWORK**

While homework assignments do have a modest contribution to your overall grade, that is almost entirely beside the point. 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.

**You will fail if you don't do plenty of homework.** 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.

### Problem Solving Sessions:

The first 30–45 min of the lab sessions are set for problem-solving. The problem-solving sessions represent an excellent opportunity to have questions answered about the homework and lecture material. You are expected to work in groups to solve problem-solving handouts, online problems, and/or chapter review questions that relate to the material being studied in lecture. If you do not show tangible participation, your simply logging into the Zoom session will not count as attendance. Remember that too many absences (i.e. days you did not truly attend) is grounds for being dropped from the course (but you cannot count on being dropped automatically).

### Problem-Solving Handouts and Chapter Review Questions

For each chapter, Problem-Solving Handouts (containing relatively basic questions), and Chapter Review Questions (containing more challenging questions) are available to download from Canvas. For both kinds of assignments, you are required to submit your answers (including the work you did to arrive at the answers) to the questions before the deadline indicated on Canvas. The deadlines will be set as we progress through the semester).

## **LABORATORY**

Since the labs are conducted online, there will be no lab partners in this course. Each student:

1. must take active part in the work,
2. report his/her data individually,
3. do his/her own calculations,
4. turn in an individual report for grading purposes, and
5. will be assigned an individual grade for every experiment.

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.

## ATTENDANCE AND DROP POLICIES

- Since this is a synchronous online course where we meet regularly per Course Lecture and Lab Schedule, a student who does not attend either a lecture or lab session during the first week of classes will be considered as a “No-Show”, and will be dropped from the course by the ‘*Last Day to Drop Without a "W"'* deadline. If you have a legitimate reason for not showing up to class during the first week of classes, please contact me as soon as possible.
- Since this is a synchronous online course, it is equivalent to on-ground classes in terms of required attendance. This means you are expected to attend every Zoom session at the scheduled time. Excessive absences put you at risk of being dropped from the class, especially if your performance on the quizzes and exams indicate that you are not engaged with the course material. You may be dropped from the course if you are absent more than 6 hours without a valid reason.
- You need to drop the class if you don’t really agree to follow all the rules and expectations stated in this syllabus. You are committing to the philosophy and the practice of the section in which **you chose** to register. You should also seriously consider switching to another lecture section, during the first week, if you observe in class that you are incompatible with the style and philosophy of the section to which this syllabus belongs.
- Missing more than one lab during the semester is not allowed even with documentable excuses, as it indicates that you were unable to honor your commitment to the course. If you miss more than one lab, you are liable to be dropped from the course. **Don’t miss labs!**
- On the other hand, it is your responsibility to drop yourself out of the class if you are not doing well in the class and do not want to receive a failing grade. Do not rely on the instructor to drop you, even if you missed enough labs that would justify your being dropped.
- It is also your responsibility to pay attention to the deadlines set by the College.

## IMPORTANT DEADLINES

- Last day to drop and receive a refund: September 12, 2021
- Last day to drop without a "W": September 12, 2021
- Last day to drop with a "W": November 21, 2021

## STUDENTS WITH DISABILITY AND/OR MEDICAL PROBLEMS

If you are a student with a disability requiring classroom accommodations, and have not contacted SSD, do so in a timely manner. SSD is located in the Student Services Annex, Room 175 or call SSD at (818) 947-2681 or TTD (818) 947-2680 to meet with an SSD counselor, or visit SSD's website for more information. If SSD has already sent the memo to instructor confirming accommodations required by student for this class, please contact me to discuss arrangements.

## GRADING

Quizzes	15%
Exams	36%
Lab Safety quiz	1%
Lab reports	20%
Homework (Handout and Chapter Review)	5%
Final Exam	23%
Total	100%

<u>% Grade*</u>	<u>Letter Grade</u>
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.

The percentage contribution of each category (Quizzes, Exams, Labs, Final) as listed above is fixed.

My grading scheme is not based on accumulation of “points”. It is based on the percent weights of each category of assessments. Overall grade at any point is a weighted average of these category averages.

Because the overall numerical grade is calculated from the **averages of each category** (Quizzes, Exams, Labs, Final), the overall numerical grade displayed by the Canvas grade book remains relatively stable as the semester progresses. For example, if your lab average is 90% after three labs, and your lab average is still 90% at the end of the term, the contribution of the labs to your overall numerical grade doesn’t change at all. The same value for the lab average contributes the same amount whether the lab average is based on 3 labs or 12. Of course the same principle applies to Quizzes and Exams as well.

***If there are mistakes to be corrected in the grading of any assessments or assignments, they must be brought to my attention within two days of receiving the information that is being claimed to need correction.***

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**.

In general there is **no extra credit** provided. If an extra credit opportunity is offered, it will be to serve a **pedagogic purpose**. It will **definitely not be in response to requests**. Asking for an extra credit opportunity will

only diminish the probability of it happening. That is because any perception that I grant extra credit if asked insistently enough would establish unhealthy expectations in future semesters.

Throughout the semester, you will find that I make every effort to ensure that you are treated fairly and that your ultimate grade reflects your overall performance. You will also find that I put in a lot of effort to make sure you understand and master the material. Having done more than my part throughout the semester allows me to enforce the letter-grade cutoffs that are stated in the previous page without hesitation. Please understand that the cutoffs are firm and are not subject to negotiation or changes based on your needs or aspirations. Missing a cutoff by 0.1% is painful (and believe me it would pain me greatly to see), but is part of the letter-grade system in which we have to operate. Avoiding such unfortunate circumstances is naturally your responsibility, by putting in the necessary effort and time during the semester, including the use of office hours, and using all the resources at your disposal. Sending me an email pleading for a higher grade makes a “curve” less likely because it would encourage the wrong behavior and wrong expectations. **Please do not contact me about raising your letter grade if you don’t want to eliminate the possibility.**

**Take the advice I will give you throughout the semester to heart.** It will help you take advantage of what I offer. It is possible to get a good grade (probably with decreased understanding of concepts) even if you reject or ignore the advice and do things “your way”. But then you will find the class unsatisfying, confusing, or even painful to endure. If that is the case, I simply ask that you take responsibility for that self-inflicted pain.

It is tempting and normal for each of us to consider ourselves special, and feel that a particular advice or warning applies only to less special, less clever, less resourceful people. **It is an act of wisdom to resist that temptation!**

#### **OBJECTIVES (#1–3) AND STUDENT LEARNING OUTCOME (#4):**

Upon successful completion of CHEM 101, General Chemistry I, the student will be able to:

1. apply principles of modern atomic theory to chemical phenomena
2. use qualitative and quantitative analysis to explain chemical phenomena, <sup>[1]</sup><sub>[SEP]</sub>
3. demonstrate proficiency in assembling basic laboratory glassware, performing fundamental laboratory techniques, making and recording relevant experimental observations and interpreting the results, and
4. solve chemical problems involving gases, solutions and energy.

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

Week of		Tuesday Lecture	Tuesday Lab	Thursday Lecture	Thursday Lab
1	08/31/21	Syllabus / Ch.1 Matter & Measurement	Ch.1 Matter & Measurement	Ch.2 Atomic Theory	Ch. 2 Atomic Theory Ch. 3 Chemical Compounds
2	09/07/21	Ch.3 Chemical Compounds	Problem solving/Lecture	Ch.4 Chemical Reactions	Problem Solving/Lecture <u>Lab: Balances/Safety</u>
3	09/14/21	Ch.4 Chemical Reactions	Problem Solving/Lecture	Ch.5 Reactions in Solutions	Problem Solving/Lecture <u>Lab: Graphs</u>
4	09/21/21	<b>Quiz 1</b> Ch.5 Reactions in Solutions	Problem Solving/Lecture	<b>Exam 1</b>	Problem Solving/Lecture
5	09/28/21	Ch.5 Reactions in Solutions	Problem Solving/Lecture <u>Lab: Metathesis Reactions</u>	Ch.6 Gases	Problem Solving/Lecture <u>Lab: Nickel (II) Salt</u>
6	10/05/21	Ch.6 Gases	Problem Solving/Lecture	Ch.7 Thermochemistry	Problem Solving/Lecture <u>Lab: Copper Chemistry and Redox Reactions</u>
7	10/12/21	<b>Quiz 2</b> Ch.7 Thermochemistry	Problem Solving/Lecture <u>Lab: Determination of the Gas Constant</u>	<b>Exam 2</b>	Problem Solving/Lecture <u>Lab: Molecular Mass of a Volatile Liquid</u>
8	10/19/21	Ch.7 Thermochemistry	Problem Solving/Lecture <u>Lab: Internal Energy Problems</u>	Ch.8 Electrons in Atoms	Problem Solving/Lecture
9	10/26/21	Ch.8 Electrons in Atoms <u>Lab: Bomb Calorimetry</u>	Problem Solving/Lecture	Ch.8 Electrons in Atoms	Problem Solving/Lecture <u>Lab: Hess' Law of Heat Summation</u>
10	11/02/21	<b>Quiz 3</b> Ch.9 Periodic Properties	Problem Solving/Lecture	<b>Exam 3</b>	Problem Solving/Lecture <u>Lab: Atomic Emission Spectroscopy</u>
11	11/09/21	Ch.9 Periodic Properties	Problem Solving/Lecture <u>Lab: Determination of % KHP &amp; Equivalent Mass</u>	<b>No Class (Veterans Day)</b>	
12	11/16/21	Ch.10 Chemical Bonding I	Problem Solving/Lecture <u>Lab: Determination of % KHP &amp; Equivalent Mass</u>	Ch.10 Chemical Bonding I	Ch.10 Chemical Bonding I
13	11/23/21	Ch.11 Chemical Bonding II	<u>Lab: Molecular Models</u>	<b>No Class (Thanksgiving)</b>	
14	11/30/21	Ch.11 Chemical Bonding II	Ch.26 (Organic Nomenclature) Problem Solving/Lecture	Ch.12 Intermolecular Forces	Problem Solving/Lecture
15	12/07/21	Ch.12 Intermolecular Forces	Review <u>Lab: Vapor Pressure and Enthalpy of Vaporization</u>	<b>Quiz 4</b> Review	Review <u>Lab: Unit Cell Geometry</u>
16	12/14/21	<b>Exam 4</b>	Review	<b>Final Exam</b>	No Lab