

Chemistry 10: Introductory General Chemistry

Course Syllabus (Section 1121)

Summer 2021, Santa Monica College

Instructor: Dr. Arno Papazyan

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OFFICE HOURS: Location: Online
M-Th: 12:30 pm-12:50 pm

LECTURES: Tuesday, Thursday 1:00 pm - 6:05 pm

LABS: Monday, Wednesday 1:00 pm - 6:05 pm

PREREQUISITES: Math 31 and High School Algebra II

COURSE DESCRIPTION:

Chemistry 10 is an introductory laboratory course. It introduces principles, laws, and nomenclature of inorganic chemistry and organic chemistry. Chemistry 10 prepares students to take the General Chemistry sequence (Chemistry 11 and Chemistry 12). Students who successfully complete this course will understand basic chemical principles and will have practiced quantitative reasoning and problem solving skills. Students will also learn about various lab techniques, including the principles of safe handling of chemicals and laboratory equipment.

COURSE FORMAT AND DELIVERY

Content will be delivered online, via Canvas as well as my website papazyan.org.

Lectures and labs will be live, conducted via Zoom sessions during the officially scheduled periods.

REQUIRED MATERIALS:

TEXTBOOK: Introductory Chemistry Essentials, by Nivaldo J. Tro, 6th edition.

CALCULATOR: A basic scientific calculator such as Texas Instruments TI-30Xa is required. Graphing or programmable calculators, computer-like devices including tablets, calculators with a large display or displaying large digits are not permitted during any quizzes or exams.

STUDY HABITS:

Prepare for each class by reading appropriate sections of the book, watching going over the slides posted on papazyan.org under the appropriate chapter resources, and attempting to answer at least some of the practice questions 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.

Seeking help

If you are having trouble with the homework, lab assignments, or lecture material, feel free to ask for my help.

Learning Disabilities Program at SMC provides resources you might need:

<https://www.smc.edu/student-support/center-for-students-with-disabilities/programs-services/learning-disabilities/index.php>

EXPECTED BEHAVIOR AND CONSEQUENCES OF NOT MEETING THEM:

- Act respectfully, collegially, and ethically.
- **Join the class or lab sessions on time.** Just as in an on-the-ground (i.e. not online) class, you are expected to be in the virtual classroom or lab on time.
- **Do not leave the session unless there is an emergency.** Let me know in advance if you need to leave early.
- **Do not create noise or other distractions** (audible conversations, laughing, giggling, etc.) during class time (kind of obvious.)

Persistent failure to operate within the expectations set in the syllabus may lead the student's being dropped from the course indirectly, if not directly. Failure to follow the behavioral standards would lead to being removed from the Zoom session, which would count as an absence. Enough absences would lead to being dropped.

Obviously, cheating and any other similar conduct violating the SMC Code of Academic Conduct will not be tolerated, and will be treated according to guidelines contained in the Code. Students must read and understand the SMC Code of Academic Conduct available at:

https://www.smc.edu/administration/governance/documents/administrative-regulations/AR_4410_StudentConductRules.pdf

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, copying of lab work. 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!

ATTENDANCE:

You **will** be dropped from the class if you fail to come to any lecture or laboratory session during the first week of classes. If I determine that a student's absence is excessive, and the student does not start attending regularly immediately, the student may be dropped. See the Lab Syllabus for the attendance requirements and the consequences of absences from the **lab sessions**.

EXAMS and QUIZZES:

The lowest exam and the lowest quiz grade are dropped. There are **no make-up exams or quizzes**. If an exam or a quiz is missed, they will be graded as zero and dropped as the lowest. Exams and quizzes cannot be taken at a different time than the time scheduled in the syllabus. Students who are late will not be given extra time.

FINAL EXAM:

The final exam is a multiple-choice test. It is cumulative; therefore it includes all of the topics covered. It has a hefty weight in determining your overall grade, and every student must take it. 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. There is **no make-up final** exam. Missing the final exam results in a final exam grade of zero.

HOMEWORK:

Homework is not graded. However, you must work on as many of the questions at the end of the covered chapters as possible to survive and thrive in this course. Practice questions and selected problems from the end of chapters are available at my website (papazyan.org). 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.

LABORATORY:

The lab activities are shown on the course schedule. The documents needed for the labs (Prelab, Procedure, and Lab Report) will be available at papazyan.org under a link called "Lab documents & links".

Labs will be conducted online via videos and/or simulations when available.

Students must join the Zoom session for each lab, during which we will go over the principles, procedure, and calculations involved. You can ask about anything that you need help with during the lab Zoom session, or later by email. You will collect the data yourself using these resources. I will be available on Zoom during the lab period to provide help in using those resources. Relevant parts of the Zoom session will be recorded and posted on Canvas as well.

The recorded videos of the experiments will be available on the Canvas home page under "Lab Videos".

Lab documents are in pdf format. You can print them out and fill them out in the old-fashioned way, use an app that allows you to annotate them, or use an online site such as dochub.com to do the same.

You will upload the completed Prelabs and Reports (sometimes known as "post-lab") to Canvas before their due date. The video of how to submit your documents will also be posted under the "Lab Videos".

If you have multiple pdf files for a prelab or a report, please use a site like combinepdf.com to merge them into one pdf file.

Since Canvas has trouble displaying large pdf files, and sometimes student-generated pdf files end up being huge (especially when they are produced from pictures taken by a phone), please reduce the size of your pdf file by using pdfcompressor.com

Prelab Assignments: Prelab work is due 24 hours before the beginning of the lab period for the particular experiment. The prelab questions can be answered by carefully reading and understanding the procedure of the experiment in question. Prelab assignment is meant to motivate you to be sufficiently familiar with the experiment before you are faced with it. You cannot submit your Prelab assignment late.

Lab Reports: You must understand the entire background and procedure for the entire experiment before attempting to prepare your post-lab Report, which is due 48 hours after the end of the lab session for that experiment. You cannot submit your Report late.

Each lab grade is broken down as follows:

Pre-lab assignment	25%	• No pre-lab assignment for the <i>Chemical Nomenclature</i> lab
Lab report	75%	

The lowest lab grade will be dropped. A missed lab report will automatically count as the dropped grade.

Lab work will be done individually. Do not copy others' work, and do not let others copy your work. Plagiarism is not hard to detect, and will result in a zero for the work in question for all parties involved in the plagiarism.

Persistent plagiarism will need to be treated as a serious ethical violation and may have serious consequences.

Ask me for help when you need it; that's a much better solution.

The "Safety Quiz" at the beginning of the term will count as a "lab", and will have the same weight as any lab. You will have multiple chances to take the quiz until you achieve better than 95% on it.

Exams and the Final Exam may contain questions related to the Lab experiments, including safety-related questions.

ATTENDANCE POLICIES:

- You will be dropped if you fail to show up to any lecture or lab during the first week of the session. You might be able to prevent that by notifying me in advance, citing a reasonable and verifiable excuse. Remember that not showing up to the first or second lab meeting will also cause you to be dropped, even if you attended the lectures.
- Missing more than 1 lab without an appropriate excuse, or 2 labs even with excuses will cause you to be dropped from class.
- 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.
- It is also your responsibility to pay attention to appropriate drop deadlines set by the College.

IMPORTANT DEADLINES:

- Last day to withdraw to receive a refund: June 25, 2021
- Last day to withdraw to avoid a "W": June 27, 2021
- Last day to request for Pass/No Pass Grade: July 21, 2021
- Last day to withdraw to guarantee a "W": July 21, 2021

STUDENTS WITH DISABILITY AND/OR MEDICAL PROBLEMS:

Students with disability-related needs or medical problems that might interfere with student's performance in class should notify the instructor and Disabled Student Services right away so that appropriate accommodations can be arranged. Do not wait until right before the exam.

GRADING:

Highest 3 of the 4 midterm exams	48%
Highest 3 of the 4 quizzes	18%
Highest 11 of 12 labs (including the safety quiz)	11%
Final Exam	23%
Total	100%

% Grade*	Letter Grade
90-100	A
80-89	B
67-79	C
56-67	D
0-55	F

* These cutoffs are applied after your average grade is rounded to the nearest integer. For example, 89.5 would be treated as 90 and would correspond to an A, while 89.499 would receive a B. You cannot count on leniency when you miss a letter grade “by a hair”. It’s the nature of the letter-grade system.

The lowest exam, the lowest quiz, and the lowest lab grade are dropped. The highest 3 exams, 3 quizzes, and the highest 10 labs contribute to the overall grade.

If there are mistakes to be corrected in the grading of any exams, quizzes, or labs, they must be brought to my attention within 24 hours of receiving the grade. Requests for corrections after that time will not be honored.

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

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

Any adjustments to the grades or a “curve”, if ever applied, would be independent of any requests.

So, there is no point in asking me to raise your grade based on your needs, ambitions, scholarship status, etc. And please understand that such requests are not entitled to a reply.

I care about your true success and I work hard to maximize it, but your pleas for raising your letter grades accomplish nothing but reduce the chances of a “curve” since I cannot allow the perception to form out there that a persistent pleading for a higher grade has a chance of success. As flawed as I think the very coarse A, B, C, D, F system is, it would be horribly irresponsible to make it meaningless by awarding grades based on what the student wishes rather than the knowledge and skill the student actually demonstrated.

STUDENT LEARNING OUTCOMES:

1. The student will demonstrate the ability to solve chemical problems using logical procedures based on well-established scientific principles.
2. The student will be able to use chemical theories to explain and predict observable phenomena, using the principles developed in Chemistry 10.
3. When conducting an experiment, the student will follow written procedures accurately and safely, demonstrate competence with lab equipment and measuring devices, and record data clearly and precisely.

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:

Content Skills

1. Write the names and formulas for acids, bases, salts and binary covalent compounds using the Stock and Classical systems.
2. Identify common organic functional groups.
3. Use dimensional analysis to solve word problems involving unit conversions.
4. Write and balance chemical equations, including oxidation-reduction reactions in acidic solutions.
5. Use the metric system and SI units.
6. Demonstrate knowledge of the behavior of gases, liquids and solids.
7. Use significant figures in measurements and calculations.
8. Demonstrate knowledge of periodic trends including atomic size, ionization energy, electron affinity and family properties.
9. Write electron configurations for atoms and monatomic ions.
10. Draw Lewis structures for simple covalent molecules.
11. Demonstrate knowledge of acidity and basicity, and pH calculations.
12. Demonstrate a basic understanding of the "scientific method."
13. Demonstrate an understanding of all types of stoichiometry including mass-to-mass, limiting reactants, gas and solution stoichiometry.

Lab Skills

1. Make reliable observations and record these observations systematically.
2. Identify and properly use common laboratory equipment and glassware.
3. Use and handle chemicals safely*.
4. Read and follow lab procedures.
5. Understand and follow* lab safety rules.
6. Conduct* simple laboratory procedures in an efficient and safe manner.
7. Report laboratory calculations with the appropriate number of significant digits.

**To the maximum extent possible in an online format*

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

Tuesday 1:00pm-6:05pm	Thursday 1:00pm-6:05pm
June 22 Chapter 1 (Scientific <u>concepts</u>) Chapter 2 (Measurement & Problem Solving)	June 24 Chapter 3 (Matter & Energy) Chapter 4 (Atoms & Elements)
June 29 Quiz 1 <u>Lecture:</u> Chapter 5 (Molecules & Compounds) Chapter 6 (Chemical Composition)	July 1 Exam 1 <u>Lecture:</u> Chapter 7 (Chemical Reactions) Chapter 8 (Quantities in Chemical Reactions)
July 6 Quiz 2 <u>Lecture:</u> Chapter 9 (Electrons in atoms and the periodic table)	July 8 Exam 2 <u>Lecture:</u> Chapter 10 (Chemical Bonding)
July 13 Quiz 3 <u>Lecture:</u> Chapter 11 (Gases) Chapter 12 (Liquids, Solids and Intermolecular Forces)	July 15 Exam 3 <u>Lecture:</u> Chapter 13 (Solutions)
July 20 Quiz 4 <u>Lecture:</u> Chapter 14 (Acids & Bases)	July 22 <u>Lecture:</u> Chapter 16 (Oxidation & Reduction)
July 27 Exam 4 Review and practice for the Final Exam	July 29 Final Exam

Lab Schedule

Monday 1:00pm - 6:05pm	Wednesday 1:00pm - 6:05pm
June 21 Quick recap of the syllabus; Q & A Introducing the Lab process Safety training	June 23 Introducing Measurements in the Laboratory The Density of Liquids and Solids
June 28 Properties of Oxygen Gas Chemical Nomenclature	June 30 Composition of Potassium Chlorate
July 5 Independence Day Holiday	July 7 Single and Double Displacement Reactions
July 12 Stoichiometry	July 14 Flame Tests of Metal Cations Lewis Structures and Molecular Shapes
July 19 Determination of the Gas Constant	July 21 Titration of Vinegar
July 26	July 28