

Syllabus – Introductory General Chemistry
Laney College – Fall, 2018
Chemistry 30A – L2 Section 41446 (Lab is 41447 or 44930)

Instructor:	Professor Joseph Lipson	Lecture:	Eagle Village – Portable 5	Tu/Th: 9:00-10:15am
Office:	A-237A	Lab: 41447	A-235	Tu/Th: 10:30 - 11:45am
		44930	A-235	Tu/Th: 1:00 - 2:15 pm
e-mail:	JLipson@peralta.edu	Course Website (w/ up to date schedule):	Canvas system – Accessed from https://laney.edu Student Email and Canvas Button	
Office Hours:	Tu/Th: 11:45-12:15pm and 2:15-2:45pm in the lab area (A-235)			

Prerequisite

MATH 201 or 210A or 208

Course Description

Fundamental principles of general chemistry: Metric measurements, matter and energy, atomic structure, chemical nomenclature, chemical bonding, chemical reactions, stoichiometry, gas laws, nuclear chemistry, properties of liquids, solids, solutions, acids and bases.

Required Materials

- **Textbook:** Tro, Nivaldo. Introductory Chemistry Essentials 6th Edition (Hardcover ISBN: 0134291808) Pearson. (*Mastering Chemistry web resource will not be used*)
- **Lab Manual:** Chemistry 50/30A Lab Manual, Laney IMC (or you can print the experiments and report sheets from the website links)
- Scientific calculator (no graphing calculators allowed)
- Appropriate lab attire (see lab instructor for details)

Optional/Recommended Materials

- Your own protective lab eyewear (minimum Z87 standard)
 - We provide ones for you to use but, the more comfortable = the more safe
- Textbook Solutions Manual (use with *great* caution as it can cause more harm than good to abuse it)

Important Dates (for a complete list please see the college website)

September 3 Last day to add a full-term class, **online**, with instructor permission number

September 3	Last day to drop a full-term class, online , to be eligible for a refund
September 3	Last day to drop a full-term class, online , <u>without</u> a “W” on transcript
October 25	No Instruction – Professional Day
November 16	Last day to withdraw from a full-term class <u>with</u> a “W” on transcript
November 22-25	Holiday – Thanksgiving
December 11	Final Exam (8-10am) in Lecture Room (see later info for 9am start time option)

Grading

Your grade in the class will be based on a total of points earned in the class. The following is a list of the total points available from each part of the course.

3 Exams (3x125pts)	375
10 Quizzes (low dropped)	200
Lab Work	200
Homework	50
Comprehensive Final	175
Total	1000

Note: The points assigned to assignments may be multiplied by a certain factor later to bring them to the total for the category (so if there ended up being 250 pts assigned for lab work I would multiply that total you earned by 200/250 to get a 200 pt equivalent).

Grades will be assigned as follows:

- A = 88% or above
- B = 77% to 87%
- C = 65% to 77%
- D = 50% to 65%
- F = below 50%

The minimum percentage required for each grade *may* be lowered at the end of the class, but will never be raised. (So a 87% might be the cutoff for an A but it won't be raised to 91% for example)

Student Learning Outcomes

1. Use dimensional analysis to solve quantitative problems and evaluate the results of calculations to make sure they are physically reasonable.
2. Clearly explain qualitative chemical concepts and trends.
3. Describe, explain, and model chemical and physical processes at the molecular level in order to explain macroscopic properties.
4. Perform laboratory techniques correctly using appropriate safety procedures.
5. Calculate experimental values from laboratory data and interpret the results.

General Information

Chemistry is a rewarding subject that provides a framework for understanding the world around us. While there will be facts that require memorization, the majority of the course is centered on a fundamental understanding of chemical and physical phenomena, and the application of that knowledge to systematic **problem solving**. These problem solving *skills* can be applied to a broad range of subjects.

Chemistry coursework is often viewed as difficult by students. In order to be successful in this course you **must** invest your time and effort into learning the various topics. This typically takes **10+ hours a week** outside of lecture and lab!. Every semester students tell me the biggest mistake they made was not investing the time it required. Please learn from their experiences. It is often the case that an extra 10 or 20% more time and effort put in *can* make a MUCH larger difference than 10 or 20% in your understanding and performance in the course.

Do not simply memorize information and problem solving steps. If you do not have sufficient *understanding* of the material and complete a sufficient amount of practice with problems, you will fail to succeed in this course.

Attendance/Expectations During Class

I expect all students to be present and on time for all lecture and lab meetings. I also know that things outside of our control sometimes happen, so if they do please e-mail me. It is critical to your success to make every effort to make it to class and be on time. This will **save you time** in the end. Generally speaking, attending lecture is amongst the most efficient methods of “studying” and learning the material.

In class I expect you to be: taking notes, working on in class problems, participating in any group activities, **asking questions**, trying your best to answer my questions to the class, remaining awake, and not disrupting the learning experience of other students. I speak more later in the syllabus about some of these topics if you want clarification.

Textbook

It is your responsibility to read the text that is anticipated to be covered in lecture **before** the class, so that you can get the most out of our *very limited* lecture time. Try your best to understand it, question it, and internalize it as you go along. I highly recommend **taking notes** (in your own words!) while reading in one column and then adding to them in lecture in the other. Do the practice problems! As you go through the problems, identify the types of steps being taken to solve the problem and, even more importantly, understand why they *can* be taken. You cannot just read the solution to a problem to learn how to do a problem. You actually have to **try** it yourself (and eventually complete it yourself).

Being creative and flexible in your problem solving allows you to solve problems you have never seen before, much like those we encounter outside the classroom. The more

problems you do the more creative and flexible you will become. Please note that reading the text once may be insufficient to completely understand the topics and you will want to go over difficult or confusing concepts again after lecture on the topic. You should never hesitate to seek help for topic, big or small.

Homework/Practice

Homework in this class is **absolutely necessary to your success**. Knowledge of facts and concepts is of little use without the ability to apply it, and that means **problem solving** (*note that if I keep talking about something, it is probably really important*). There is no shortcut to becoming a good problem solver. You have to do lots of problems. You will struggle. You will get frustrated at times, but trust me when I say, "This is the only way to **earn** your problem solving skills." Many students who have embraced this have told me how the skills have translated to other classes, even that same semester. This is the whole idea! You may not plan to become a chemist, and you may not even do chemistry in any form again, but you WILL face hard problems that these skills will apply to. Homework assignments will be collected on the day of the quiz covering that material, and will be worth 5 points each. Your lowest homework score will be dropped. Detailed solutions to the problems are in the solutions manual. However, in order to succeed in this class, you must be able to do these problems on a test, without the help of the solutions manual. In order to learn how to do the problems, you need to struggle with them for a while. Don't turn to the solutions manual too soon. Also, sometimes the solutions manual contains mistakes. Don't go against your better judgment and write down a wrong answer just because it's in the solutions manual.

**** When you turn in your homework**, write on the top of the first page the number of problems that were honestly attempted over the number of problems assigned, and circle it. Alternatively, you may write "all" or "all - 1" indicating how many problems you did. If you are dishonest here, you will receive **no credit** for the assignment. Since all of the answers are available, homework will be graded mainly on **completeness**. Of course, you must show your work, and also make sure to write the answers in your own words. (It's obvious when people copy the answers from the solutions manuals.) **You are responsible for checking your answers to the homework problems**. Most problems assigned have answers in the back of the book or on the worksheet itself. (You can also buy the solutions manual or check it out from the reserve desk at the library, assuming they have received a copy)

Assigned problems can be found on the course website. This will include worksheets and problem sets from outside the textbook in addition to questions from the textbook. They should be completed as soon as we cover the appropriate topics for the question. This will give you the opportunity to **ask questions** and **get help** (*if needed*).

While I **highly** encourage students to form study groups and help each other with problem solving strategies, if you do not attempt and complete the vast majority of assigned problems on your own (go back and do them again if you solve them as a group in order to prove you really understand them) you will *struggle to even pass this class*.

When exam time comes around, it will do you no good to have only had someone explain how to do the problems or walked you through them.

If you don't struggle with the problems yourself, no amount of observation will allow you to sufficiently master the material for the exams. This also means you should attempt most of the homework problems with only those resources you have at your disposal during an exam (calculator, equations you aren't told to memorize, a few constants, and a periodic table). If you are having trouble completing the problems without solution guides and the book, you need to spend more time reading, going over notes, and **practicing extra problems** to master the material. You should keep track of which problems in the homework are giving you trouble so you can be extra sure to review them before the quizzes and exams. If you look at the solutions guide or get help with a problem, for your own sake, go back and try it again later. *Everyone learns differently, so find what works best for you and **do it**.*

Quizzes

Quizzes will *approximately* be weekly and cover material from the previous week (but not what was covered the lecture immediately prior). Each quiz is worth about 20 points and will usually be given **at the beginning of lecture**. The quizzes will be **heavily** based on the assigned problems, including the *occasional identical* problem. Quizzes are meant to test whether or not you are keeping up with the coursework and are typically more straightforward than the exams. I drop the low of your 11 quizzes.

Exams

There will be 3 tests worth 125 points each. You will not be allowed to use any kind of notes during an exam. Generally, no make-up tests will be given, unless the instructor is notified, agrees to the make-up and arrangements are made before the test is scheduled (e-mail or in person), except in extraordinary circumstances as determined by the instructor. Students qualifying to take their tests with special accommodations must give the instructor the appropriate paperwork the lecture period before the test (preferably sooner).

The exams will require you to demonstrate your understanding of the relevant topics from class and lab. In order to do so efficiently you *must* have sufficient practice from the homework and extra resources provided, including laboratory experiments. This does *not* mean that the questions will be identical to those in the homework and elsewhere, therefore memorization will not serve you well. Expect to face new wrinkles in the problems on the exam, so flexibility will be essential. There will be minimal multiple choice questions throughout this class.

Your lowest exam score will be replaced by your final exam percentage if this leads to a higher overall grade in the class. Usually only half of the class will

get a higher percentage on the final than their lowest exam score, so don't rely on a very high final exam score.

Note: If you fail an exam you are REQUIRED to submit to me, in writing, a short statement outlining your efforts prior to the exam and what you plan on changing to prevent a recurrence of your failing grade. This is due within one week of receiving your graded exam back. You are also required to discuss this plan with me and get free tutoring in the tutoring center or during my office hours. If you fail to do this, you *may not* be allowed to take any further exams. The intent of this policy is to make changes soon enough to prevent failure in the course, not to punish a momentary struggle.

Final Exam

There will be a comprehensive final in this class (8:00 am - 10:00 am, Tue., December 11 in A-233). You may begin the final at 9:00 am and finish at 11:00 am if this shift will NOT conflict with another classes final (I understand some of you cannot make an 8am start time). The final is worth 175 points and therefore is critical to your success in the class, so don't wait to study until the final days of the class. If your final exam percentage is higher than your lowest exam percentage, I will raise that exam percentage to match your final exam percentage.

My Role

I will do my best to help you take your newfound knowledge and distill it into something clear and meaningful. We will work *together* to understand how all of the, sometimes, apparently disparate, topics fit together into a deeper understanding of the natural world. As you learn the concepts, we will use those to solve new and interesting problems. We will also work in reverse, where we look at problems and their solutions to derive a better conceptual understanding. While I am always eager to assist you in your journey for knowledge...

The final responsibility for learning lies with you.

I am available to answer questions, clear up misunderstandings, clarify concepts, and help you hone your problem solving skills. I implore you to **ask questions** during lecture when a topic or statement doesn't make sense or you are just curious about something. **I love questions.** Don't worry if you aren't sure the question is pertinent to the discussion. That is my job, not yours. It does neither of us any good to keep going with lecture when anyone is lost or confused. If I ever appear confused or concerned by your question, it is because I am trying to think about the topic in a different way to better explain it for you, not that lack of understanding is in any way a problem. If there isn't time to answer the question right then, I will do my best to get you an answer as soon as possible afterwards. You can always seek my help during lab (as time permits) and in office hours.

I am also available by e-mail. I will open discussion forums on the website if students are interested in using them.

Where to Get Help

Laney College has a free tutoring center in SC 300 (check to see if it had been moved since this writing). The hours that chemistry tutors are available will be posted once we know them. Tutors aren't there to do your work for you but to give you hints and advice on solving the problems. I also encourage you to work with your classmates. Many times they are your best resource, and you should get phone numbers and e-mails so you can get together and solve problems. There are often online resources students find that can be very helpful, so don't forget to look if you are lost and in need of immediate help, just be careful that your sources are reliable. Lastly, I am available in office hours, and by e-mail, so ***please don't hesitate to ask***. I am here to assist in your chemistry education, and I am happy to be of help.

Disability Support Services

Accommodations: Students with documented learning and/or physical disabilities may receive reasonable classroom and/or testing accommodations. Please make these arrangements with me at the beginning of the semester or as soon as possible after documentation has been determined. Last minute requests may not be determined to be "reasonable." Students with disabilities are encouraged to meet with me in private to discuss their services and accommodations. Please bring your "Services and Accommodations" form from the Disability Services Program to our meeting. This information will be kept confidential and will not affect your grade. Also, students who think they could use support from the Disability Services Program for temporary or permanent conditions, or if you suspect you might have a learning disability, please visit their website (<http://www.laney.edu/wp/dsps/>) and contact their office (510-464-3428) in Building E, Room 251.

Helpful Tips

- 1) Plan on spending **10+ hours** of your week on chemistry outside of class. You cannot do everything on the weekends, so plan to invest a few hours a day in reading, doing problems, preparing for lab, and completing lab reports. For some students it takes *considerably* longer to achieve the level of mastery required for the course. Keep this in mind.
- 2) *Read* the textbook. If you read the material before you come to class you will be able to focus more on the way I present/view the material and connect the material together than focusing on basic definitions and terminology. Furthermore, as you read take notes and write down questions you may have so that you can ask them during lecture when I cover that topic. There will be nuances that I won't have time to emphasize in lecture and I *expect* you to get from the textbook.
- 3) *Be organized!* By keeping your notes, problems, and lab material well organized you can find things when you need them and not lose track of important papers. Furthermore, use the schedule I give you to keep track of when tests/quizzes are,

when topics are being covered, and what is going on in lab. Being prepared requires knowing when things are needed.

- 4) *Practice, practice, practice.* You cannot learn to do problems simply by reading about them. You have to try your hand at the problem, play with it, and eventually overcome it in order to learn the necessary skills.
- 5) *Don't try to memorize your way through the class.* There is a reason behind everything in chemistry and understanding those basic reasons allows you to predict many behaviors so that you don't have to memorize them. Memorization fades quickly, but fundamental understanding lasts. (This is my foremost personal strategy for learning chemistry, or anything really!)
- 6) *Be assertive.* You are here for your education, first and foremost. **Ask questions** when you have them. You probably have been told dozens of times that there are no stupid questions, and it is actually true! The only "dumb" question is the one you don't ask. Waiting only makes it harder, but you have to be willing to ask for help to receive it. If you need assistance in lab, the instructor won't know to come help you if you don't get their attention. No one knows what you need better than you, so don't rely on us to guess what it is you need to succeed.
- 7) *Get help early!* So often the first time I hear from a failing student is halfway through the semester when it is very difficult to turn things around. **Come to office hours whenever you like, for any reason you like.** Seek help from your classmates and friends. There are lots of resources available if you are willing to look or ask for them.

Miscellaneous Policies

Absences

I would appreciate your notifying me of your intentions to stay in or drop this course if you are absent for 2 days or more. If 4 days of class (do not need to be consecutive) are missed, the student MAY be dropped from the course. Do not rely on the instructor to drop you however! Always file your paperwork (usually available via online systems) with the Admissions Office. There are also financial aid implications to your decision to drop or remain in the course, so please look into that before making your decisions.

Technology

Please be polite and turn off cell phones during class time. They cannot be used while taking tests. No texting in class! Recording of any kind must be approved by me, and if you are using an electronic device to take notes, pictures, or access suitable resources please let me know beforehand. Please make every effort to stay awake in class as you will miss valuable information/announcements and distract your neighbors.

Class Materials

You are responsible for picking up all handouts and returned materials. Extra handouts and any returned materials not picked up will be available after class, during lab, or during office hours (depending on when it was returned). In addition almost all of the materials traditionally handed out will instead be posted online using the course website. If you have trouble accessing the website please let me know immediately.

Academic Integrity

Academic dishonesty is defined as “an act of deception in which a student claims credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work”. This includes (but is not limited to) copying or **collaboration** on a quiz, test or **assignment (especially lab reports!!)**, use or attempted use of unauthorized materials, altering or interfering with evaluation documents, falsifying experimental data or results, plagiarism, and assisting another student in an act of academic dishonesty. It is appropriate for you to seek help from your instructor, tutors, and your colleagues. I encourage you to work together; as a matter of fact we will sometimes work with partners/groups in the laboratory to collect data. This does **not** mean that copying or working together and submitting identical lab work is acceptable (including calculations and equations). Each person should work on his/her own lab report individually (even the graphs!).

Any students caught cheating on a quiz, test, or lab will receive a zero for that quiz, test, or lab, and a disciplinary report will be filed with the appropriate office. A second instance of cheating in this course will result in an “F” in the course. We have to maintain our academic integrity because you want your academic record to count for something. Nobody would respect your degree or credits if our integrity can be questioned.

Laboratory

The laboratory is an integral part of chemistry and your chemistry education. We will be exploring new concepts, applying concepts from lecture, strengthening our understanding of the physical world, and learning new practical skills in lab. You will be responsible for submitting a pre-lab before every experiment that isn't simply worksheet problems. This pre-lab should be an outline of the experiment we are going to perform and you will have to read the experiment fully to complete this pre-lab. The pre-lab is due at the beginning of lab and is required to begin the lab. It will be made due in lecture if people are skipping lecture or working on them in lecture. Each pre-lab is worth 2 points.

Every experiment has an accompanying report form that must be completed according to the instructions on the form. These will each be worth about 8 points to bring each lab to a total of about 10 points. Due dates are posted on the schedule! I will drop your low lab grade. If you do NOT complete 4 or more labs, including the report form, you

CANNOT PASS the class regardless of your points earned. This is because lab is an integral part of the course.

All lab reports are due at the beginning of lab on their due date

Lab reports will be made due in lecture if students begin skipping lecture to finish their lab reports!

Penalties for Late Work:

Not turned in during the first 5 minutes of class: -10%

Turned in the class after it was due: -20%

Turned in 2 classes after it was due: -40%

No work will be accepted more than 1 week late except under extreme circumstances.

**Let's have a fun, successful, informative,
and productive semester!**

Content (*Note: Each topic is not equally weighted and this isn't necessarily the order we will follow*)

Lecture Content:

- 1) Measurements 10%
 - a) Scientific notation
 - b) Significant figures
 - c) Unit conversions
 - d) Density
- 2) Atoms and Elements 8%
 - a) Elements
 - b) Introduction to the periodic table
 - c) Isotopes and their symbols
 - d) Orbitals and electron configurations
- 3) Compounds and Their Bonds 14%
 - a) Valence electron s and the octet rule
 - b) Naming and writing ionic formulas
 - c) Covalent bonds
 - d) Lewis structures
 - e) Naming and writing formulas of covalent compounds
 - f) Molecular geometry and polarity
- 4) Energy and States of Matter 10%
 - a) Specific heat
 - b) Energy and nutrition

- c) States of matter
- d) Intermolecular attractive forces
- e) Phase changes
- f) Heating and cooling curves
- 5) Chemical Reactions 10%
 - a) Writing and balancing chemical equations
 - b) Classifying types of reactions
 - c) Oxidation-reduction reactions
 - d) Reaction energy
 - e) (Optional: rate of reaction and chemical equilibrium)
- 6) Chemical Quantities 10%
 - a) The mole and molar mass
 - b) Conversions between grams, moles, and number of molecules
 - c) Percent composition and empirical formulas
 - d) Stoichiometry problems
 - e) Percent yield
- 7) Gases 10%
 - a) Kinetic-molecular theory
 - b) Pressure
 - c) Boyle's, Charles', Gay-Lussac's, and the Combined Gas Law
 - d) The ideal gas law
 - e) Partial pressures
- 8) Solutions 10%
 - a) Properties of water
 - b) Predicting relative solubility of various compounds
 - c) Equivalents of electrolytes
 - d) Concentration units: Molarity and percent composition
 - e) Dilutions
 - f) Osmosis
- 9) Acids and Bases 10%
 - a) Properties
 - b) Conjugate acid-base pairs
 - c) Relative strengths
 - d) pH
 - e) Acid-base reactions and titration problems
 - f) Buffers
- 10) Nuclear Radiation 8%
 - a) Natural radioactivity
 - b) Nuclear equations
 - c) Detection and Measurement of radiation
 - d) Half-life
 - e) Nuclear fission and fusion

Lab Content:

- Metric measurements and density 6%
- Physical properties 6%
- Paper chromatography 5%
- Separation of mixtures 6%
- Molecular modeling 6%
- Specific heat 6%
- Chemical and physical changes 6%
- Determination of empirical formulas 6%
- Stoichiometry 5%
- Double replacement and single replacement reactions 6%
- Gas laws 6%
- Line emission, flame tests 6%
- Periodic properties 6%
- Solubility and structure 6%
- Concentration of solutions 6%
- pH of solutions 6%
- Titration 6%