De Anza College-Fall 2017 (9/25-12/15)

Chemistry 1B, General Chemistry

Chem 1B- Section 01	Chem 1B-Section 02
Lecture MWF 9:30AM-10:20AM, SC1102	Lecture MWF 9:30AM-10:20AM, SC1102
Lab MW 11:30AM-2:20PM, SC2204	Lab MW 2:30PM-5:20PM, SC2204

Instructor: Dr. Chris Deming, email: cdemo87@gmail.com

Office Hours (Tentative): Friday 10:30 AM-12:00 PM, Wednesday 5:30 PM-6:30 PM, Science Center, Second Floor

Course Description: This class will cover the principals of chemical kinetics, intermolecular forces, chemical equilibrium, and thermodynamics.

This course is divided into two separate instructional periods, the lecture and laboratory sections. The lecture portion is primarily devoted to the material discussion while the laboratory portion gives a chance for students to practice chemical experimentation. One registration code will enroll for the lecture and lab sections. Lecture and lab sections must be taken together to pass Chem 1B and will both go towards a single grade.

Course Material:

1. **Lecture Text**: CHEMISTRY: The Molecular Nature of Matter and Change, Silberberg and Amateis, 8e. You may use other editions to study, but homework problems assigned will be from this edition.
2. **Lab Manual:** http://www.deanza.edu/chemistry/Chem1b.html. Lab manuals must be read BEFORE performing each lab. Further instructions to follow.
3. **Lab Notebook:** Permanently bound, 8 ½ X 11 notebook
4. **Scientific Calculator.** Logarithm and exponential functions required, NO GRAPHING CALCULATORS. You are encouraged to bring your calculator each day to work through examples as they are presented. Phones will not be allowed for calculations during tests so be sure to bring a calculator those days.
5. **Safety Goggles.** Proper eye protection is required for every lab. Without goggles, the lab cannot be performed and the student receives a score of 0 for that day. Lab approved goggles are available at the bookstore. Any other goggles must seal to the face with an elastic strap and be specifically for chemistry.

Class Registration. This class is a lecture and laboratory based course, so the registration limit is strictly set at 30 students per section based on the number of people able to safely conduct experiments in the space provided. The class is filled based on the official roster provided by the De Anza Admissions and Records, including an official waitlist. Students on this waitlist will not be permitted to come to lab sections or given a locker until officially enrolled.

Dropping the Course. Students that choose to drop this course are responsible for requesting a withdrawal through the admissions and records department **before** the deadline. Students who drop the class are also be required to officially check out of the lab locker. Failure to check out by the scheduled check out date will result in fees and a block placed on future registrations.

Other important points.

1. If you **miss** a lab lecture or experiment the **first day** of class, you will be **dropped** from the course unless previous arrangements have been made with the instructor.
2. More than one unexcused absence from lab will result in an automatic "F".
3. If you drop within the first two weeks of class, your lab locker will be inspected for missing items, you will be charged for missing or broken items, and the locker will be reassigned
4. If you fail to check out of the locker for any reason, you will be charged an administrative fee and a hold will be placed on your account until resolved

Grades/Evaluations:

	Points
In-Class Exams, 3 total (100 points each)	300
Prelab/Lab Book, 8 total (5 points each)	40
1-2 day labs, 6 total (10 points each, drop lowest)	50
3-4 day labs, 1 total (20 points each)	20
1 Formal Lab Report	40
Lab Final	100
Lecture Final	250
Total	**800**

Grade Assignment. This rubric is subject to change throughout the quarter.

Grade	Percentage
A	>90
B	80-90
C	70-80
D	60-70
F	<60

Tentative Dates. All exam dates, lecture topics/dates, lab topic/dates are listed on page 5 and are subject to change throughout the quarter. The final exam date will not change and is provided on page 5 as well as the De Anza finals schedule page.

Class Lecture

This class (Chem 1B) will cover chapters 5, 12, 16, 17, 18, and 20 from the assigned textbook. The lecture will serve to cover the most important aspects of the chapter but students are still responsible for all material in the book chapter. **Homework** will be assigned but will not be collected. Students are expected to complete all of these questions as well as the sample problems throughout the chapter. A list of suggested problems is given later in the syllabus. This list represents the minimum problems to complete, but more practice will always help, so try to go beyond just the assigned problems. Below are four helpful tips that make learning much easier this quarter.

1. Read the chapter *before* attending lecture. This will make the presented material much easier to understand. Also, as mentioned before, there is not enough time to go over every topic in extreme detail so reading is essential to obtain the complete picture.

2. Complete all practice problems assigned and all of the in chapter reviews. Questions for the tests will be similar to these problems so it is worth it to give a thorough attempt completing these questions. Extensive practice of these problems is the best way to ensure concept mastery. There are plenty of problems to try in the book and throughout the internet so be sure to take the time to practice problems.

3. Don't fall behind. In chemistry, each new topic will build on the previous so it is essential to understand the topics as they are presented. Following a lecture when you do not understand the previous material is not an effective method for learning and will lead to further problems. To avoid falling behind……

4. Get help. If you are having a difficult time with a topic, it is your responsibility to get help. There are plenty of resources, including myself, for aiding in material comprehension, but it all starts with you making an effort to get this help. You are also encouraged to find a study group or coming to office hours.

Lecture Exams. There will be three lecture exams to test comprehension throughout the quarter. Exams will cover material from lectures, homework, and book chapters. If you are having difficulty completing the homework questions for that chapter, you are urged to get help *before* taking the test. Questions will range from easy to difficult and may require solving problems that have not been explicitly demonstrated before.

Each exam is worth **100 points** and the final exam is cumulative and is worth **250 points**. No late or early finals will be administered. If you feel the grading of any exam is incorrect, you must turn the test back in within **one week** of the day the exam is passed back.

Laboratory Notebooks. You are expected to maintain a bound lab notebook for the lab portion of this course. The experimental procedure for the upcoming lab, tables for data entry as well as recognition of the hazards must be written in this notebook *before* attending lab session (prelabs). Each prelab is worth 5 points and must be completed before the laboratory session or the student will not be allowed to complete the experiment and will receive a 0 for that lab for that day. No print outs will be allowed for procedures. Instructions for keeping a proper lab notebook are given in following sections.

Lab Lecture/Experiment. Students are required to attend all lab sessions. This includes the lecture at the beginning of the lab period and the entire experiment. Arriving late to lab will result in a loss of points and potentially prevent the student from participating in the lab that day. Labs are generally broken up into more than one section and all section must be attended for credit for that experiment.

There are no make-up labs. Missing lab will result in a 0 for that lab and more than one unexcused absence will result in an "F" for the class. It is also the student's responsibility to understand all theory and practice of lab experiments as they will be on the lab final and will help maintain safe lab procedures. If there is an excusable absence, you must notify *before* the missed lab or this will count as a missing lab. If there is an emergency and you cannot contact me before lab, please do so as soon as possible.

If you miss lab lecture the first day of class for any reason, you will be dropped from the course.

Laboratory Report. A guideline for formal lab reports is given later in this syllabus. A formal lab report is due for only one lab

For the other 7 labs, you will be required to perform calculations, answer lab based questions, and write a conclusion. The work will be checked **before** leaving lab to receive lab credit for that experiment. The lowest of your 10 point labs will be dropped. The 20 point lab cannot be dropped.

Lab Final. The lab final will test your understanding of the theories utilized in lab sections this quarter as well as the practices implemented to yield meaningful data. This exam is worth 100 points and is administered the last week of instruction. You will be allowed to use your lab notebook during this test, so it is beneficial to efficiently organize your notebook and to pay attention to the topic introduction at the beginning of lab. The lab final date is indicated in the following lecture/lab schedule. No early or late exams will be allowed.

Lecture Schedule

Lecture topic is in black, review days are in green, and test dates are in red.

Week Of	Week #	Monday	Wednesday	Friday
(9/24/17)	1	Chapter 5 (Gases)	Chapter 5 (Gases)	Chapter 5 (Gases)
(10/1/17)	2	Chapter 12 (IMFs)	Chapter 12 (IMFs)	Chapter 12 (IMFs)
(10/8/17)	3	Review Chapters 5 and 12 Chapter 16 (Kinetics)	EXAM Chapters 5 and 12	Chapter 16 (Kinetics)
(10/15/17)	4	Chapter 16 (Kinetics)	Chapter 16 (Kinetics)	Chapter 16 (Kinetics)
(10/22/17)	5	Chapter 17 (Equilibrium)	Chapter 17 (Equilibrium)	Chapter 17 (Equilibrium)
(10/29/17)	6	Chapter 17 (Equilibrium)	Chapter 17 (Equilibrium)	Chapter 17 (Equilibrium)
(11/5/17)	7	Review Chapters 16 and 17 Chapter 18 (Acids and Bases)	EXAM Chapters 16 and 17	Chapter 18 (Acids and Bases)
(11/12/17)	8	Chapter 18 (Acids and Bases)	Chapter 20 (Thermodynamics)	Chapter 20 (Thermodynamics)
(11/19/17)	9	Chapter 20 (Thermodynamics)	Chapter 20 (Thermodynamics)	Chapter 20 (Thermodynamics)
(11/26/17)	10	Chapter 20 (Thermodynamics)	Review Chapters 18 and 20	EXAM Chapters 18 and 20
(12/3/17)	11	Final Review	Final Review	Final Review

LECTURE FINAL EXAM
MONDAY December 11, 9:15-11:15 AM

Chapter	Problems
5	2, 7, 8, 9, 11, 14, 20, 23, 24, 27, 30, 33, 37, 45, 49, 55, 73, 74, 77,82, 84, 87, 92, 98, 116
12	1, 4, 10, 11, 13, 15, 18, 24, 32, 38, 39, 40, 42, 49, 52, 63, 70, 72, 81, 88, 89, 96
16	1, 3, 8, 12, 15, 20, 25, 26, 35, 44, 48, 49, 51, 56, 61, 70, 73, 74, 78, 79, 85, 90
17	2, 3, 4, 7, 12, 13, 18, 22, 29, 31, 35, 42, 45, 50, 51, 57, 59, 67, 68, 72, extras
18	3, 5, 10, 13, 22, 24, 25, 30, 43, 44, 48, 49, 60, 63, 70, 72, 84, 99, 111
20	2, 4, 5, 9, 13, 14, 17, 22, 23, 33, 38, 44, 49, 52, 54, 58, 63, 68, 75, 89, 104

Lab Safety/Preparedness

Maintaining safety in a laboratory is a primary concern. There are many hazards associated with chemistry labs and it is important to understand these hazards and that with proper techniques, the risk drops significantly. There are a few, very simple steps students should take to execute safe lab techniques and gain full points for this section.

First, always wear personal protective equipment (PPE) when performing lab experiments. Such items include, but are not limited to, safety goggles, long pants, sleeved shirt, and closed toe shoes. A more detailed list containing safe lab procedures and general practices will be handed out, reviewed, and signed before starting experiments.

Second, read the lab procedure BEFORE coming to lab and write in your notebook the materials needed and step required so that all hazards are known ahead of time and may be properly addressed. Notes, facts, or some recognition of the hazards is required for the prelab to ensure the section on safety has been read. Reading the procedure ahead of time and knowing what tasks are at hand will also help the experiment go smoothly.

Finally, listen carefully to the directions provided at the beginning of the lab session. Many techniques can be performed safely and easily with the proper technique but become a safety hazard when performed improperly. If the lab lecture is missed, the student will not be allowed to perform that lab. Below is a partial list of safe and effective experimental practices.

1. Students must comply with all safety procedures and precautions when attending a laboratory session.
2. There will be no make-up labs so you are expected to attend all lab sessions
3. Properly prepare for each experiment by reading the procedure BEFORE class and writing in your lab notebook. Students will be awarded 1 to 5 points based on thoroughness and effectiveness
4. Lab data must be written in your lab notebook. Loose paper or napkins are not suitable for recording data.
5. Lab lecture must be attended. Failure to do so will result in missing that lab and losing all associated points.
6. Know the location of all emergency equipment such as fire extinguisher or first aid kit as well as the evacuation route and safe meeting place
7. Goggles are always required when in lab. This is for your protection. Prescription glasses do not count as safely goggles and must be worn under the goggles.
8. Long pants must be worn at all times. This is to protect you from chemical spills.
9. Closed toe shoes must be worn at all times. Again, this is to protect you against chemical spills or sharp, falling objects.
10. Sleeveless tops or tops exposing large portions of skin are not allowed
11. Long hair should be tied back and loose clothes should be fixed to prevent dipping in chemicals or catching fire if Bunsen burner is near
12. Report any injuries to the instructor immediately. It is important to get you the help you need if injured in lab, so please do not hesitate.

13. Report any large spills to the instructor immediately. Large accumulations of chemicals can cause hazards to you and those around you
14. No eating or drinking in lab.
15. Do not eat on taste any chemicals
16. Do not pipette liquids by mouth.
17. Do not smell a chemical directly. If the experiment requires you recording the smell, waft the vapor towards your nose.
18. Do not grab recently heated equipment because they stay hot for a while
19. Lab equipment is for designated experiments only. Unauthorized use of equipment will result in loss of points
20. Do not use an open flame near flammable materials
21. Use the fume hood when designated
22. Clean up all broken glassware immediately with a broom. Do not clean by hand. Dispose all broke glassware in the correct container
23. No chemical goes down the sink except pure water. Discard chemicals in the assigned container.
24. Do not pipette from the stock solution bottles. Instead, bring a beaker to the stock bottle, dispense the required amount, and pipette desired amount once back at your lab bench. Remember to replace the cap on the reagent bottle.
25. Do not pour excess reagent back into the stock bottle. Instead, properly dispose in designated container. To avoid discarding unused chemical, try hard to estimate the amount of chemicals needed before dispensing from stock solutions.
26. Read all labels on stock bottles carefully and label all beakers used to dispense each reagent
27. Keep equipment away from the edge of the lab bench
28. Avoid heating closed containers. This will result in pressure build up a possible eruption and injuries
29. Clean up after yourself. This includes lab equipment, the reagent bench, your bench, the weighing stations, the floor around you, and anywhere that you may make a mess. Failure to do so will result in point loss. Continual messiness may result in loss of all points for that lab.
30. Try not to touch your skin/face during lab session. Given the chance that there are chemicals on your hands, spreading the coverage will only make matter worse.
31. Wash your hands after every lab session.
32. Assume a chemical or procedure is hazardous unless you know otherwise
33. Follow all direction by the lab instructor

Maintaining a Neat and Effective Lab Notebook

Laboratory notebooks are essential for any scientist. Our primary goal as chemists is to understand the complexities of the world around us by performing specifically designed highly controlled experimentation. Thus an easily accessible and highly organized means of recording observations or data is necessary for the obtaining the most accurate and detailed account of the experiment.

The following instructions should serve to indicate the minimum requirement for the upkeep of the lab notebook for this course.

General Lab Notebook

Name and starting date on the cover. In the case of original research, you may be working with many others in the same space and need to distinguish your notebook from another's. Additionally, when you go back and look through old notes, dates on the cover allow easy recognition of the correct notebook. Your name and starting date must be on the cover before starting the first experiment.

Table of Content. Keeping a detailed table of content is another easy and effective way to organize your observations and data entries. This table must include the title of the experiment, the date of the entry, and the page number. Update each lab session.

Table of Chemicals. At the end of the notebook will be a table that lists every chemical you use and the corresponding hazards. This will be updated throughout the quarter and will serve to promote safe chemical practices as well as provide an easily accessible means of finding hazards of common chemicals. Information for this table can be found on the MSDS sheets.

Each Experiment

Title and Date. The title of the experiment and the date of lab session must be at the top of the page.

Abstract. A *brief* summary of the experiment should follow the title. This should include the main purpose of the experiment, the laboratory procedures you will use, and the relevant mathematical relationships between measurable quantities.

Experimental Procedure. The experimental procedure is a detailed description of the method utilized to obtain experimental data. The written procedure should be in your own words, not copied directly from the lab manual and should be detailed enough that you do not need to look at the laboratory manual. This must all be completed before the laboratory session or you will not be allowed to perform the experiment for safety reasons.

Observations. The phenomena you observe can yield as much information as the most detailed measurements. Observations like temperature change, bubbling, color change, or solid formation should be recorded next to the related experimental procedure. Additionally, record any instrument problems or issues with the experiment. If your data is extremely far from expected, your experimental observations may give insight as to the source of such discrepancies.

Data Tables and Calculations. Recording data should be done in a well-organized table next to the corresponding experimental procedure. Good examples of effective data table organization can be found in the laboratory manual for each experiment. All data should have proper units as well as the proper level of significant figures for the instrument utilized.

Calculations should be written neatly and final answers should include units. For each type of calculation, you must demonstrate one example using your data. If graphing is required, both computer generated and hand-drawn representations are acceptable as long as axes are appropriately labeled and scaled.

Conclusion. This section is the most important and often the most difficult because it requires deep consideration of the experiment as a whole. The conclusion should be completed before leaving lab and should contain at least these three sections.

The first is a brief summary of the experiment including the main goal and the methods used to collect/analyze data. This should not be more than two sentences and should be specific to each experiment.

For the next section, present the key values. Many of the experiments require numerous tables and measurements and including all of these values is not the point of this section. Only include the values that directly relate to the experimental goal. For example, in the lab titled "Molar Volume of a Gas", the conclusion should contain the calculated value for the molar volume of a gas, but does not need all the pressure measurements. Additionally, compare one trial to the next and/or compare the average value to literature values if possible.

Finally, provide a source of error that may have resulted in discrepancies between trials or accepted values. This should go beyond simple factors like human error and should connect an experimental design or procedural step to an error in your value. That is, explain how such an error could have affected your result by following this error through the calculation process

Laboratory Report Guidelines

What follows, indicates the minimum requirement for the lab report. A formal laboratory report is only required for only one lab. The due date will be specified after the experiment is performed.

Title. The name of the experiment should be at the beginning. This does not need to be extremely large but should stand out.

Abstract. This section should briefly describe the experimental setup, display key experimental values, and characterize the validity of the values based on accuracy and precision. This section should be about a paragraph and definitely less than one page.

Procedure. You should already have a detailed description of the experimental procedure in your lab book so simply reference the pages where this is located.

Data and Calculations. Data should be listed in a table or tables. The tables should be clearly labeled and entries should have proper units. Include graphs in this section. Each graph should have a title, properly labeled axes, and scaling that fits the data of the current experiment.

All chemical formulas must be written with appropriate subscripts or superscripts. If you do not know how to do this on your computer, please ask for help or check out the help feature of the processing program. Calculations should be written neatly and final answers should include units. For each type of calculation, you must demonstrate one example using your data. Always include units.

Discussion/Analysis. Include a discussion of the practices and theories that allow for the collection and analyzation of scientific information. This should also include comments on the validity of the mathematical relationship utilized. I will give more guidance and examples for this section throughout the quarter.

Conclusion. This section should be the same as the conclusion you write in your notebook for each lab.