

Berkeley City College

Chem 1A (#23589) Syllabus Spring 2018

Instructor: Siraj Omar, Ph.D.

(email-1: somar@peralta.edu)

(email-2: sirajomar@sbcglobal.net)

(web: www.berkeleycitycollege.edu/wp/somar)

I. Class Meetings:

Lecture:	0800 - 1050	TTh	(Room 431)
Lab (Section-1):	1330 - 1620	T	(Room 521, chemistry lab)
Lab (Section-2):	1330 - 1620	Th	(Room 521, chemistry lab)
Office hours:	1400 - 1600	MW	(LRC)

II. Class Description & Objectives

Chemistry 1A is the first part of a two semester general chemistry course, which will cover topics that include atomic structures, electron configurations, periodic properties, bonding theories, and molecular shapes; the concept of moles, molar mass and stoichiometry; thermochemistry; intermolecular forces and the properties of gases, liquids, solids, solutions and colloids. This class assumes that you have the basic knowledge of basic chemistry that is equivalent to one year of high school chemistry or the successful completion of an introductory chemistry course. Mathematics skills, particularly algebra, are essential for your success in this class. You must be comfortable with word problems, percentages, and logarithm. (Chem 1A is a pre-requisite for Chem 1B. It is a transferrable course to UC and CSU, and is a required subject for all science majors, medical degree, and degrees in dentistry and pharmacy.)

Student Learning Outcome:

Upon completing this course students will acquire the following knowledge and skills:

1. Solve quantitative chemistry problems and integrate multiple ideas, that include incorporating stoichiometric and algebraic relationships, in problem solving processes.
2. Explain qualitative trends in physical and chemical properties of elements and use molecular level concepts (physical and/or chemical) to explain macroscopic properties of matter.
3. Perform experiments according to laboratory safety procedures; collect and analyze experimental data; interpret results that include graphs construction; write organized laboratory reports.

III. Books and Supplies

- Primary textbook: OpenStax (OER): <https://openstax.org/details/chemistry>. (Required)
- Supplementary text: Zumdahl & Zumdahl: Chemistry, 9th Edition, Cengage Learning. (Optional)
- Chem 1A Laboratory Manual, Siraj Omar, Berkeley City College, Copy World Printing. (Required)
- Lab notebook, safety goggles, and scientific calculators. (Required)
- Lab-coat or apron. (Recommended)

IV. Grading: 1. Weighting factors:

Tests	36%
Finals	20%
Quiz	16%
Lab.	20%
Homework	8%

2. Distribution of Grades:

A	$\geq 90\%$
B	79 - 89%
C	65 - 78%
D	51 - 64%
F	$\leq 50\%$

[Note that points accumulated from homework assignments, lab reports, quizzes and tests are not equivalent. It is the percentage score from each section that is important.]

V. Homework Assignments

Homework will be assigned weekly through online homework provider (www.saplinglearning.com). There'll be 20-25 homework problems to be assigned for each chapter, and about 10 practice problems from selected chapters will also be included for extra credits.

VI. Quizzes, Mid-terms and Final Exam:

A total of 9-11 quizzes (one per chapter) may be assigned each semester, but only the top eight (8) of your quiz scores will be entered into the final grades. In addition, there will be three (3) midterms and a final exam, all of which will be counted into the final grade. Each midterm exam will cover materials from 3 - 4 chapters discussed during the previous 3-4 weeks, but the final exam will be comprehensive. Dates for midterms and the final exam are indicated in the class schedule (given in this syllabus). If there is a conflict to any of these dates due to a prior commitment, please inform me at least one week before the quiz or midterm exam is scheduled, so that an alternative date could be arranged for you. If you miss a midterm or the final exam due to sickness, you must provide a medical certificate or a doctor's note.

VII. Laboratory Experiments

Laboratory is an important component of this class, and you will perform about 12 experiments, and you will write a comprehensive lab report for each of them. During lab you may perform experiments with one or two partners and you will be sharing the experimental data. However, lab reports must be written and submitted individually. Please DO NOT copy your partner's lab reports. Plagiarism is an academic offence. You will be given a "zero" grade for your lab reports if it is determined that you have copied someone else's work.

Please read the following guideline for the laboratory preparation and for writing lab reports:

1. You must read the experiment and complete the pre-lab exercises before coming to the class. Pre-laboratory exercises must be turned in at the beginning of the lab period. You WILL NOT be allowed to perform the experiment if you have NOT read the experiment or done the pre-labs.
2. You MUST have a lab notebook that is dedicated strictly for your laboratory work and it should not be used as a lecture note book. The lab notebook is where you keep records of all experimental data (measurements and/or observation). (You will be asked to leave the class if you come without a lab notebook and the grades for that experiment will be forfeited.
3. **Preparing Lab Notebook and Writing Lab Reports**
 - Lab notebook: For each experiment, please start on a new page for each experiment and you must have the following written in the lab notebook before you come to the laboratory perform any experiment: (1) *Title*; (2) *Objective*; (3) *Procedure* (outline or list steps to be carried out), and (4) *Data Table*.
Please do this in your lab notebook before the lab period, so that you're familiar what needs to be done during the experiment and not waste precious laboratory time.
 - Lab report: Organize lab report using the following format: (1) *Title*; (2) *Objective*; (3) *Overview*; (4) *Procedure*; (5) *Data Table*; (6) *Calculations* (if applicable); (7) *Summary*; (8) *Answers to Post-lab questions*. The final lab reports must be organized according to the format mentioned above, or points will be deducted.
4. At the end of each experiment, please show your data to your lab instructor before leaving the lab. (Your lab instructor may ask you to complete some of the calculations before allowing you to leave.)
5. You may be required to type some of the final lab reports, but you're highly recommended to type all lab reports. **Please use only black or blue ink when writing experimental data or lab reports.** And there **must be at least a 1-inch margin (or border) on the left, right, top, and bottom of each page of your reports**, regardless whether you type your lab reports or not. Also, please attach the original copy or a photocopy of the original data. **Carbon copies will NOT be accepted.**
6. To avoid penalty. the final lab reports must be turned in within one week the experiment is completed. **Lab reports that are more than 3 weeks overdue will NOT be graded.**

VIII. Safety in the Laboratory

Safety in the laboratory is of primary importance.

1. You **MUST ALWAYS WEAR APPROVED SAFETY GOGGLES** during laboratory classes, regardless of whether you are doing an experiment or not.
2. **SHOES MUST BE WORN** - sandals or flip-flops are **NOT** allowed in the laboratory. It is also strongly recommended that you wear protective clothing.
3. Any kind of experimentation with chemicals, other than those you are assigned to do, is strictly prohibited.
4. You **MUST NOT** eat or drink in the laboratory.

VII. Reading/Studying

- It is crucial that both the reading and pre-laboratory work be completed before you come to class or lab. You are responsible for keeping ahead in reading the chapters.
- Studying is an active process, which includes doing a lot practice problems, summarizing ideas in your own words, and memorizing facts and formulas.
- You should expect to spend a minimum of 10-12 hours per week (sometimes more) that you'll need to read the textbook and lecture materials, do homework assignment and lab reports, and to study for quizzes and exams. Do the homework problems each day a few at a time. **DO NOT** leave the studying to the last minutes. It **DOES NOT** and **WILL NEVER WORK** in chemistry.

VIII. Academic Decorum and Attendance

- Attendance in lectures and labs are important and will be recorded. Be sure to sign the attendance sheets. Please contact me if you find yourself in a situation that might cause you to miss more than a week of classes.
- You are strongly encouraged to take notes during lectures and participate during class discussions. You **WILL NOT DO ANY HOMEWORK PROBLEMS** during lectures.
- Be punctual! If you arrive late, enter quietly. If you must leave the class early, sit where you can leave with the minimum disruption to your fellow students and the instructor.
- Please respect the desire of others to learn and refrain from talking during lectures. If you have any questions regarding the lecture materials, please raise your hand.

IX. Integrity

- All work submitted for grading must be your own work. Copying is cheating and is an unacceptable behavior. Cheating during quizzes or exams will earn you an automatic zero for those quizzes or exams.
- Be a full and active participant when you work on assignment with other students. If you just copy the groups or your partner's data, you have not learned anything and you are wasting your time.

****PLEASE TURN OFF ALL SMART PHONES, I-PAD, TABLETS & LAPTOPS DURING LECTURES**

Academic Calendar for Spring 2018

January 22	M	Spring semester begins
January 27	S	Last day to add w/o Permission #,
February 2	F	Last day to add in person with Permission # or Add Card.
February 4	Su	Last day to add a regular class online with Permission #.
February 4	Su	Last day to drop classes without a W.
February 4	Su	Census due – Instructor’s Enrollment Verification
Feb 16-19	F-M	Holidays - President’s Weekend
March 16	F	Last day to file for AA/AS Degrees and Certificates
March 22	Th	Professional Day
April 2 - 6	M-F	Spring Recess
April 2	M	Cesar Chavez Day
April 26	Th	Last day to drop a class and receive a "W";
April 26	Th	Attendance Verification Day – Instructors verify Enrollment
May 18	F	Malcolm X's Holiday
May 21-25	M-F	Final Exam Week
May 28	M	Memorial Day Holiday
June 1	F	Final Grades due.

Spring Semester 2018, Chem 1A Lecture and Lab Schedules

Wk	Date	Lecture/Lab [†]	Lecture Topics	Quizzes
1	01/23 01/25	Lecture-1 Lecture-2 Lab-1	Course outline; Chemistry in Context (1.1 – 1.3) Chemistry in Context (1.4 – 1.6); <i>Briefing on Lab and Safety Guideline; Safety Video & Safety Quiz;</i>	
2	01/30 02/01	Lecture-3 Lecture-4 Lab-2	Graphing Technique; Atoms, Molecules, and Ions (2.1 – 2.3); Atoms, Molecules, and Ions (2.4 – 2.6); <u>Experiment-A2: Error Analysis & Graphing</u>	Quiz #1 (Chapt-1)
3	02/06 02/08	Lecture-5 Lecture-6 Lab-3	Chemical Nomenclature (2.7); Composition of Substances and Solutions (3.1 – 3.4); <u>Experiment-A3: Paper Chromatography</u>	Quiz #2 (Chapt-2)
4	02/13 02/15	Lecture-7 Lecture-8 Lab-4	Stoichiometry of Chemical Reactions (4.1 – 4.2); Stoichiometry of Chemical Reactions (4.3 – 4.5); <u>Experiment-A4: The Empirical Formula of an Oxide;</u>	Quiz #3 (Chapt-3)
5	02/20 02/22	Lecture-9 Test #1 Lab-5	Test Review (Chapters 1 – 4.2) <u>Experiment-A5: Formulas of Hydrates</u>	*Quiz #4 (Chapt-4)
6	02/27 03/01	Lecture-10 Lecture-11 Lab-6	Thermochemistry (5.1 – 5.3); Enthalpy Measurements and Calculations (5.3); Electromagnetic Energy (6.1); <u>Experiment-A6: Reactions in Aqueous Solutions</u>	
7	03/06 03/08	Lecture-12 Lecture-13 Lab-7	The Bohr Model and Quantum Theory (6.2 – 6.3); Electronic Structure and Periodic Properties of Atoms (6.4 – 6.5); <u>Experiment-A7: Acid-Base Titrations</u>	Quiz #5 (Chap-5)
8	03/13 03/15	Lecture-14 Lecture-15 Lab-8	Ionic & Covalent Bonds, and Lewis Structures (7.1 – 7.4); Strength of Ionic and Covalent Bonds (7.5); <u>Experiment-A9: Heat Capacity & Enthalpy of Dissolution</u>	*Quiz #6 (Chap-6)
9	03/20 03/22	Lecture-16 No Lecture Lab-9	Molecular Structures and Polarity (7.6); Valence Bond Theory and Hybridization (8.1 – 8.2); Professional Day <u>*Experiment-A12: Lewis Structures and Molecular Shapes</u> (as homework assignment; due 03/29)	
10	03/27 03/29	Lecture-17 Test #2 Lab-10	Test Review (Chapters 4.3 – 7.5) <u>Experiment-A10: Spectrophotometric Analysis of Cobalt(II) Chloride</u>	*Quiz #7 (Chapt-7)
	04/2 – 7	(M-S)	SPRING RECESS	

Wk	Date	Lecture/Lab [†]	Lecture Topics	Quizzes
11	04/10 04/12	Lecture-18 Lecture-19 <i>Lab-11</i>	Molecular Orbital Theory (8.3 – 8.4); Gases: Pressure; Ideal Gas Laws & Stoichiometry of Gas Reactions (9.1 – 9.3); <u>Experiment-A11: Qualitative Analysis of Cations</u>	
12	04/17 04/19	Lecture-20 Lecture-21 <i>Lab-12</i>	Gases: KMT; Effusion-diffusion & Real Gases (9.4 – 9.6); Gases: <i>Atmospheric Chemistry</i> ; <u>Experiment-A8: Molar Volume of Ideal Gas</u>	Quiz #8 (Chapt- 8)
13	04/24 04/26	Lecture-22 Lecture-23 <i>Lab-13</i>	Intermolecular Forces; Properties of Liquids & Phase Diagrams (10.1 – 10.4); Types of Solids & Lattice Structures (10.5 – 10.6); <u>Experiment-A13: Enthalpy of Vaporization and Enthalpy of Fusion of Water</u>	Quiz #9 (Chapt- 9)
14	05/01 05/03	Lecture-24 Test #3 <i>Lab-14</i>	Test Review; (Chapters 7.6 – 10) Problem solving work-sheet	*Quiz #10 (Chap-10)
15	05/08 05/10	Lecture-26 Lecture-27 <i>Lab-15</i>	Properties of Solutions & Raoult's Law (11.1 – 11.3) Colligative Properties & Colloids (11.4 – 11.5); <u>Experiment-A14: Molar Mass by Freezing-Point Depression</u>	
16	05/15 05/17	Lecture-28 Lecture-29 <i>Lab-16</i>	Catch-up Final Review (Last day to turn in lab reports for Experiment-A14 & Experiment-A13)	Quiz #11 (Chap-11)
17	05/22	Final Exam	(Comprehensive)	

* - these are either take-home or group quizzes.

† - All formal lab reports must be typed with 1.5 spacing, including experimental data; please use a font size no smaller than size 10. Data must be organized in table format; the calculations and chemical equations may be hand-written. Each lab report must be organized according to the format that contains the following sub-headings:

1. Title of experiment;
2. Objective(s)
3. Overview
4. Procedure
5. Data Table(s)
6. Calculations (including error analysis when applicable)
7. Results Summary and Conclusion

Guideline for Writing Lab Reports

In this class, you are required to have a standard lab notebook where you will keep all experimental data. Your lab notebook should only be used for entering and keeping experimental data and writing lab reports. Data must be entered in non-erasable black or blue INK. Prepare your lab notebook and complete the pre-lab exercises before coming to the lab.

Before each lab period you must prepare your lab notebook as follows:

- Start on a fresh page for each experiment and enter the date.
- Write the title and objective of the experiment to be carried out;
- Under Experimental Sub-Heading, list the chemicals and/or equipment that would be used in the experiment;
- Prepare a Data Table for your experimental data.

Format for Formal Lab Reports

Your formal Lab Reports MUST be organized according to the following format and must be typed. The formal lab reports must contain the following sub-headings and organized as such:

1. **Experiment Number and Title**
2. Date of Experiment: _____
3. **Your Name:** _____
4. **Partner:** _____

5. **Objective:**

State the purpose of the experiment, that is what the experiment intends to show, prove or determine, in one sentence (or in separate sentences if there are more than one objectives).

*6. **Overview:**

An "Overview" is: (1) an explanation of the chemical concept of the experiment; that is, the chemical principle involved in the experiment, which (2) must includes all the necessary equations (chemical and/or mathematical) that are applicable to the experiments. If an experiment involves chemical reactions, (3) you must write the chemical equations. However, if the experiment is about chemical reactions and writing balanced equations is the objective, then you do not have to write the equations in the Overview, because you will be writing them under the result section. (4) State what data (measurements/observations) will be collected and what calculations will be done to achieve the objective of the experiment. Provide the mathematical formulas or equations that will be used in the calculations to obtain experimental results.

7. **Procedure:**

Summarize or list what you need to do during the course of the experiment in short sentences so that you or others reading your lab report understand what you did during the lab. Write the reference source from where the experiment is obtained. For example: R.A.D. Wentworth, Experiments in General Chemistry, 8th Edition, page ??). If there is any modification in the procedure, describe this briefly. Mention any specific safety precaution if applicable and waste disposal information.

8. **Data Table**

Data MUST be presented in the tabulated form.

All data and observations MUST be entered directly into the lab notebook in black or blue INK. If you make mistakes, cross it with a single line such that the original can still be read. If you make mistakes, cross it with a single line such that the original can still be read. Label data clearly so that you as well as other readers know what each piece of data represents.

9. Calculations

All calculations must be clearly written, properly labeled and organized. Data and calculated results must be presented in correct significant figures and appropriate units. (Note that data values obtained from equipment such as electronic balances MUST NOT be rounded off.)

10. Error Analysis (only if applicable)

Some experiments may require you to calculate the means and standard deviation of your results, where

$$\text{Mean, } \bar{x} = \frac{1}{n} \sum_{i=1}^n x_i \quad (\text{where data } x_i \text{ is obtained } n \text{ times.})$$

$$\text{Standard Deviation, } S = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

If the true value of the determined quantity is known, express the accuracy of your result in term of percentage error:

$$\% \text{ Error} = \frac{(\text{Experimental value} - \text{True value})}{\text{True value}} \times 100$$

If several values are obtained for a given quantity and an average value is calculated, express the precision of your results in term of Relative percent deviation,

$$\text{Percent Relative Range (PRR)} = \frac{(\text{Highest value} - \text{Lowest value})}{\text{Average value}} \times 100$$

11. Summary and Conclusion:

Summarize your experimental results and state whether the experimental objective(s) is/are achieved. Mention source(s) of errors that might affect your results.

[Not every experiment will require an error analysis. Only those experiments where the correct value(s) are known or more than one results of the same parameters are determined will require an error analyses.]

(*Overview and Error Analysis are not required in lab reports that do not require formal lab report write-up.)

[Note: Most experiments are carried out with one or two partners and you will be sharing data with your partner(s). However, lab reports must be done and turned in individually. You MUST NOT COPY your partner's lab reports, except for the data and calculations that you have worked on together. Plagiarism is an academic offence and there will a penalty on your reports.]

Five Reasons Why Students Fail Chemistry

1. Insufficient Math Preparation

Math, especially algebra, is an essential tool in chemistry. To be able to solve chemistry problems requires that you understand basic algebra and you must have the ability to transform word problems into mathematical expression. If you think that your math is a bit rusty, get help immediately. Don't wait until you're halfway through the semester.

2. Not Getting of Reading the Text.

Textbook and lab manual are NOT optional items in the chemistry class. Even if the lectures are fantastic, you'll need the text to do the homework assignments. The best way to understand the lectures is to read the chapter before coming to each lecture. You will find it much easier to follow the lectures after you have read the chapter. Reading before class is especially critical when you want to do an experiment, that you must read the entire experiment before coming to the lab to conduct any experiment. Otherwise, you will be conducting the experiment without actually understanding what it is all about and, most importantly, you might compromise on the laboratory safety issues.

3. Procrastination

If you intend to pass and do well in chemistry you MUST study the lecture materials and do the homework promptly. NEVER put off studying and doing the homework assignment until you are halfway through the semester. It will be too late and you will never catch up. If you miss the basics, you'll get yourself into trouble. To master chemistry you must understand the concept. This requires that you study and do the homework on a daily basis. Build the concept a little at a time. Set aside a small segment of time each day for chemistry. It will help you gain a long-term mastery. Do not cram at the last minute.

4. Not Doing Your Own Work

Homework assignments are helpful if you do the exercises yourself. Study guides and solution manuals are useful only if you use them for help or for checking your work, but not as an easy way to get your homework done. Don't let a book or someone else do your work for you. They won't be available during examinations, which will account for a major portion of your grade.

5. Psyching Yourself Out

You must have a positive attitude toward chemistry. If you truly believe you will fail you may be setting yourself up for a self-fulfilling prophecy. If you have prepared yourself for the class, you must feel reasonably confident that you will succeed.

BERKELEY CITY COLLEGE

Chem 1A, Spring 2018
Student Academic Survey Form

Your Name _____

Tel. No. (____) - _____

email: _____
(please write clearly)

1. What are your academic majors or career goals?
2. Have you taken and passed Chem 30A or any equivalent Introductory Chemistry classes? When and where? (Name the college where you took the class). What grade did you get?
3. Have you taken the California State Diagnostic Test for General Chemistry? When? What was your score?
4. Will you be taking Chem 1B after completing this course? _____
5. What is your academic load this semester? _____ units/semester; _____ hrs of lecture/wk
6. Are you working? Yes/No. If Yes, what is your workload? _____ hr/wk

(Note: This class will require you to spend a minimum of 12 hours per week outside the lecture periods. It normally consume up two-third of your study time.)

7. Which of the following learning styles apply to you? (Choose all that apply.)
 - A) Visual and Verbal Learning Style
 - B) Visual/Nonverbal Learning Style
 - C) Tactile/Kinestatic (or hands-on) Learning Style
 - D) Auditory/Verbal Learning Style
8. What major challenges are you expecting from this class? What do you hope the lectures will do for you?
9. Please list any questions or concerns.

[Note: if you require special accommodation for taking quizzes and exams, please make arrangement with the DSPS office; I will not be providing any accommodation during class time.]