

## Chemistry 1B-61 Course Outline

Fall 2019

INSTRUCTOR: Dr. Billie Lo [billielo@comcast.net](mailto:billielo@comcast.net)

Laboratory: MW 6:00 PM- 7:15 PM SC2204

Lecture: MW 7:30 PM-10:20 PM SC2204

Credit: 5 units

Prerequisite: Chem 1A with a C or better.

### COURSE DESCRIPTION:

Chem 1B is a pre-professional chemistry preparation for students planning a scientific or science related career field. A rigorous study of the fundamentals of chemistry at the first year level combines the study of thermo-dynamics, chemical kinetics, and solution equilibrium. The course includes both lecture and lab work designed to prepare students to enter fields of study as chemistry engineering, medicine, dentistry as well as biological sciences.

### TEXTBOOK

Chemistry, The Molecular Nature of Matter and Change, Martin Silberberg, McGraw Hill, 8<sup>th</sup> edition, 2017.

### Lab Manual

Can be found on-line at <https://www.deanza.edu/chemistry/pdf/1B/Experiments> Click on the Experiments and download the details for each experiment.

A simple **Scientific Calculator** (non-programmable) for all the quizzes and exams, **Safety goggles** must be worn in the lab at all times.

**Academic Dishonesty: Any form of academic dishonesty will be ground for dismissal from the course.**

### THE LABORATORY

Lab safety rules are strictly enforced. **SAFETY GLASSES or GOGGLES** must be worn **AT ALL TIMES** while you are in the laboratory. Each student is required to have a **lab notebook** to outline the lab procedures, record experiment data, and calculations. It will be evaluated as part of the grade. You are expected to arrive in the laboratory on time. Preview the lab materials before coming to lab is required. Students must check out with me at the end of each lab to have their notebook stamped and sign a roll sheet. Each laboratory experiment must be completed within the specified time. When that period is over, no credit can be given for the lab, but **all labs must be completed to receive a grade in the course**. All lab work not conducted will be graded as a zero.

### BASIS OF EVALUATION

#### A. Quizzes (Approx. 10-15 minutes):

Quizzes will be given in class frequently and is given to those students who are present when the quizzes are passed out. No make-up quiz will be given. Each quiz counts 10 points or more. If the total score of quizzes is more than 100 points, all the extra points are counted as extra credits.

#### B. Hourly Exam:

Three hourly exams will be given during the quarter. Make-up exam shall be given for serious and compelling reasons only. Arrangement should be made with your instructor **PRIOR TO EXAM TIME** by all means. Any late exams if allowed will be subject to 10% deduction in grade.

#### C. Final Exam:

A comprehensive final exam will be given. Student who misses or fails the final exam will not receive a grade C or better.

#### D. Attendance:

Attendance will be enforced. **Any student who has two or more lab or lecture absences may be dropped from the course.**

#### E. Chemical Disposal:

As a concern for the environment, proper chemical disposal is essential. Students who do not comply with directed procedures may be dropped from the course for repeated offenses.

#### F. Grading:

Quizzes	100+
Exams	330 Points
Final exam	250 Points
Lab Grade	320 Points
Lab Exams (140)	
Lab Reports(90)	
Lab Notebook (50)	
Performance (40)	

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Total 1000 points

**>1000 pts A+, 880-1000pts A, 780-879 pts B, 650-779 pts C, 500-649pts D**

#### G. Worksheets

Three worksheets will be assigned, 10 points each as extra credit points.

WORKSHEET	Date open	Date Due
1. Molecular Geometry – Lewis structure, molecular geometry, bond order, bond angle & polarity	9/25/19	9/30/19
2. Manipulation of Equilibrium Constants	10/21/19	10/28/19
3. Acid/Base Equilibrium	11/6/19	11/13/95

#### I. Home work

**The on-line “Connect” homework is optional. The problems are actually the textbook END of Chapter problems.**

You may use it as a tutorial tool. Feel free to ask for Hint or answers; use it as a self-study guide. **Do your assignments in a timely manner can help you understand the material better and get better grades for the exams. You will earn 50 extra points toward your final grade if you score 70% of the total assigned points. However,** an access code which may be purchased separately or comes with a new textbook is required. The “CONNECT” web address is:

<https://connect.mheducation.com/class/b-lo-chem-1b---61-F-2019>

**Note:** Homework problems are **not** necessarily an indicator of the types of problems that will be found on quizzes or exams. It is important for the students to have a thorough understanding of the concepts lectured, as well as the related materials covered in your textbook. Read your textbook at least one time and understand the sample problems is the minimum efforts you should make aside from the homework assignments.

## J. CHEMISTRY 1B LABORATORY SAFETY RULES

1. **SAFETY GLASSES OR GOGGLES** must be worn **AT ALL TIMES** while you are in the laboratory. Each student is required to have a **lab notebook** to outline the lab procedures, record experiment data, and calculations. It will be evaluated as part of the grade.
2. You are expected to arrive in the laboratory on time. Tardiness of 15 minutes or more will not be permitted. Preview the lab materials before coming to lab is required
3. Students must clean and return all items from the stock room **no later than 7:15 PM** each day of the experiment.
4. Student must check out with the instructor at the end of each lab to have their notebook stamped and sign a roll sheet.
5. Each laboratory experiment must be completed within the specified time. When that period is over, no credit will be given for the lab, but **all labs must be completed to receive a grade in the course**. All lab work not conducted will be graded as a zero.
7. **Chemical Disposal:**  
Proper chemical disposal is essential. Students who do not comply with directed procedures may be dropped from the course for repeated offenses.
8. Please note that you are required to **officially** check out of your lab locker whether you remain in the course or drop the course. Failure to check out of lab on time will result in a late fee and may also result in your grades being held and a block placed on your future registration.
9. **If you drop within the first two weeks of class and fail to check out of lab, your locker may be reassigned to another student by the instructor, and you will be held responsible for any missing or broken lab locker equipment. After the first two weeks of class you must checkout by the assigned checkout date for your laboratory section.**

## K. FORMAT OF THE LABNOTEBOOK (must be a **permanently bound notebook**):

1. Number and Title of the experiment
2. Purpose/theory of the experiment (brief)
3. Formula for the calculation.
4. Procedure in detail for the experiment. A photocopy of the lab manual is not allowed. Check with the lab instructor which section will be performed next to minimize preparation time and effort.

**The above should be fully prepared prior to attending the lab lecture and it should be stamped before lab lecture.**

5. Data (laboratory work) must be entered **immediately** and **directly** into the lab notebook **in ink**.
6. Calculations

The laboratory midterm and final are “**open-notebook**”. A well-prepared notebook would be helpful during these exams.

## L. FORMAT OF THE LAB REPORT

1. Number and Title of the experiment.
2. Theory (more detail) and formula for the calculation
3. Procedure for the experiment (brief).
4. Data and calculation. Show at least one set-up for each different type of calculations.
5. Results (including all graphs) and discussion in doubt.

**Report is due on day 2 of the next experiment. Penalty for late reports: 1-2 day late less 10%, 2-7 day late less 40% More than 1 week late, less 60%.**

**Chem 1B Tentative Lecture & Lab schedule Fall 2019**

WEEK	DATES	LECTURE	LABORATORY
1	9/23/19 (M)	<b>Ch 5 Gases</b> – Properties of gases <b>Pressure. units</b> , Boyle’s law (V & P), Charles’s law (V & T), Avogadro’s law (V & n); combined ideal gas law	Check In
	9/25/19 (W)	<b>Ch 5 Kinetic molecular theory</b> molecular energy distribution, an ideal gas; diffusion and effusion; van der Waal’s equation; vapor pressure; vapor pressure and boiling point; partial pressure & Dalton’s law	MOLAR VOLUME (1)
2	9/30/19 (M)	<b>Review, worksheet #1 molecular polarity</b> - Electronegativity; periodic trends of electronegativity; bond polarity; <b>12.1 Intermolecular forces</b> (IMF), relative strength of IMFs: ions versus permanent dipoles versus temporary dipoles; hydrogen bond, <b>Water</b>	MOLAR VOLUME (2) (VERNIER)
	10/2/19 (W)	<b>Ch 12 Phase diagrams</b> , phase changes: melting, freezing, evaporation, condensation, sublimation, deposition; heat of fusion, heat of vaporization; heating-cooling curves; phase change equilibrium; triple point; critical point; supercritical fluids	VAPOR PRESSURE (1)
3	10/7/19 (M)	<b>Ch 12</b> Surface tension; capillarity; viscosity; crystalline versus amorphous solids; crystal lattices; unit cells: simple cubic, body-centered cubic, face-centered cubic; cubic versus hexagonal closet packing; conductors, semiconductors, and insulators; liquid crystals	VAPOR PRESSURE (2)
	10/9/19 (W)	<b>Exam 1 •</b>	GREEN SALTS(1)
4	10/14/19 (M)	<b>Ch16 Kinetics</b> – A molecule in motion stays in motion.	GREEN SALTS(2)
	10/16/19 (W)	<b>Ch16 Rate laws 12.5 Collision theory</b>	GREEN SALTS(3)
5	10/21/19 (M)	<b>Ch 16 Reaction mechanisms</b> – <b>Taking a reaction step-by-step.</b>	GREEN SALTS(4)
	10/23/19 (W)	<b>Ch17 Equilibrium, Equilibrium constants 13.2 Reaction quotients</b> ; similarity and differences between K and Q; Kc versus Kp , Predicting direction of reaction by comparing Q and K	IODINE CLOCK REACTION (1)
6	10/28/19 (M)	<b>Ch 17.4 Solving equilibrium problems</b>	IODINE CLOCK REACTION (2)
	10/30/19 (W)	<b>Ch 17 Le Châtelier’s Principle</b>	IODINE CLOCK REACTION (3)
7	11/4/19 (M)	<b>Exam 2•</b>	IODINE CLOCK REACTION (4)
	11/6/19 (W)	<b>Ch 18 Acids and bases</b> <b>Definitions of acids and bases: Arrhenius, Brønsted-Lowry, Lewis; acid dissociation constants (Ka); strong acids and strong bases •</b>	Kc BY SPECTRO 20 (1)
8	11/11/19 (M)	<b>VETERANS’ DAY - Holiday</b>	Holiday No Class
	11/13/19 (W)	<b>Ch 18 The pH scale</b> Auto-ionization of water; definition of neutral versus neutralized; pH scale; temperature dependence of neutral pH; pOH; Kw	Kc BY SPECTRO 20 ((2)
9	11/18/19 (M)	<b>Ch18 Strong versus weak acids</b> , Conjugate acid-base pairs; relative acid strength and direction of neutralization; determining Ka from; relationship between Ka and Kb;	Ka OF A WEAK ACID (1)
	11/20/19 (W)	<b>Ch 18 Salts</b> - Salts that yield acidic, basic, and neutral solutions; solutions of weakly acidic cations and weakly basic anions; salts of amphoteric ions	Pka OF INDICATOR (1)
10	11/25/19 (M)	<b>Ch 18 Acid-base reactions Polyprotic acids</b>	Pka OF INDICATOR (2)
	11/27/19 (W)	<b>• Exam3 •</b>	CALCIUM HYDROXIDE (1)
11	12/2/19 (M)	<b>Ch 20 Spontaneity</b> 16.4 <b>Free energy</b> - entropy; microstates; first, second, and third laws of thermodynamics; standard molar enthalpies; entropy changes in common chemical and physical processes	CALCIUM HYDROXIDE (2)
	12/4/19 (W)	<b>Ch 20 Reaction progress diagrams</b> Determining entropy microscopically and macroscopically; calculating entropy; spontaneity of endothermic and exothermic processes <b>Ch 20 Entropy</b> – The disorder in my office is constantly increasing.	LAB CHECK-OUT LAB FINAL
12	12/9/19 (M)	<b>Ch 20</b> Relationship between free energy and equilibrium; free energy outside of the standard state; reaction progress diagrams Review	
	12/11/19 (W)	FINAL	

## Laboratory Safety Rules *Please sign this form and return it to your instructor*

From the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty:

- 1) Chemistry Department-approved safety goggles purchased from the De Anza College bookstore (NOT safety glasses) must be worn at all times once laboratory work begins, including when obtaining equipment from the stockroom or removing equipment from student drawers, and may not be removed until all laboratory work has ended and all glassware has been returned to student drawers.
  - 2) Shoes that completely enclose the foot are to be worn at all times; NO sandals, open-toed, or open-topped shoes, or slippers, even with socks on, are to be worn in the lab
  - 3) Shorts, cut-offs, skirts or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab: ankle-length clothing must be worn at all times
  - 4) Hair reaching the top of the shoulders must be tied back securely
  - 5) Loose clothing must be constrained
  - 6) Wearing jewelry such as rings, bracelets, and wristwatches in the laboratory should be discouraged to prevent chemical seepage in between the jewelry and skin..
  - 7) Eating, drinking, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture
  - 8) Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture
  - 9) Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.
  - 10) Students are required to know the locations of the eyewash stations, emergency shower, and all exits
  - 11) Students may not be in the lab without an instructor being present
  - 12) Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.
  - 13) Except for soapy or clear rinse water from washing glassware, NO CHEMICALS MAY BE Poured INTO THE SINKS; all remaining chemicals from an experiment must be poured into the waste bottle provided.
  - 14) Students are required to follow the De Anza College Code of Conduct at all times while in lab: "horseplay", yelling, offensive language, or any behavior that could startle or frighten another student is not allowed during lab;
  - 15) Strongly recommended: Wear Nitrile gloves while performing lab work; wear a chemically resistant lab coat or lab apron; wear shoes made of leather or polymeric leather substitute.
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By signing below, I, \_\_\_\_\_,  
First Name Family Name

acknowledge that I fully understand and agree to abide by the laboratory safety rules listed above. Further, I acknowledge that my failure to abide by these rules will result in my being dropped from this chemistry class immediately.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Student Learning Outcome(s):**

- \*Evaluate the principles of molecular kinetics.
- \*Apply principles of chemical equilibrium to chemical reactions.
- \*Apply the second and third laws of thermodynamics to chemical reactions.