

## Chemistry 1B-03Z Course Outline

Fall 2021

INSTRUCTOR: Dr. Billie Lo

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Lecture: MW Synch 6:00 PM- 7:15 PM Zoom Meeting

Laboratory: MW Synch: 7:30- 8:20PM

Asynch: 8:30 PM – 10:20 PM

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.

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Due to corona virus situation, this class will be an online class for the Fall 2020 quarter, which means you do not have to be on campus to complete any portion of it. You will participate in the course using De Anza college CANVAS. and zoom. **Student should have access to a computer, or a smart phone with internet connection**, Refer to Student Hub the De Anza Online Resources for Students on the De Anza web site, <http://www.deanza.edu/online-Fall> Student Resource Hub to see how to join the Zoom lecture or the lab sessions. You may also use De Anza Library Chat room for help. If you have any specific needs I should be aware of. please let me know. The PCC Disabled Students Programs and Services is available to assist you during this course.

### **TEXTBOOKS:**

Chemistry, The Molecular Nature of Matter and Change, Martin Silberberg, McGraw Hill. [Silberberg 9 ed.png](#)

Connect Access Code with ebook attached Refer to Canvas for information; you purchase the code separately if you already have the book.

Simple Scientific Calculator (non-programmable), **Safety goggles.**

### THE LABORATORY – HOL and Virtual Labs

- (1) HOL lab kits are provided by De Anza College with no charge to the students. You **should order the HOL kit directly from the De Anza bookstore** after the Censors Day when the student enrollment is finalized (around the third week). If you are not in the U.S. this quarter, you should let the bookstore know so they can ship the kit by air and include the invoice inside for custom clearance purpose.
- (2) Virtue Labs: Link are provided on Canvas for the virtual labs. Additional labs are conducted as worksheets, details 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. VV

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

### BASIS OF EVALUATION

A. 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.

B. 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.

C. Homework

The "Connect" **on-line homework assignments** are divided into three parts for each Chapter – the conceptual and the selected end of the chapter problems (divided into ChX-1 and ChX-2). The **advantage of doing them on-line is that you can get instant feedback, or online tutoring when you make a mistake or when you need help.** Doing it in a timely manner (a few questions every day) would help you understand the materials better, thus get better grades. Feel free to open the finished assignments for review at any time because the final performance reports sum up your highest scores for each chapter only. The due day is usually set right on or shortly after the lecture on the chapter is done. On completion of 60% of each assigned homework you will get 20 **points** toward your over-all grades. **The reason for such low setting of only 60% is to encourage you to use the "help" or "hint" on-line to save time while still learning from the assignments.** The program is set to allow late submission; but with **7% deduction** in points per day. You may use the link on Canvas to reach the Connect website or the link below:

<https://connect.mheducation.com/class/b-lo-chem-1b-02z-fall-2021-9ed>

D Worksheets – 4 Worksheets for a total of 40 **extra points**

Worksheet #	Topic	Week	Due Date	Points
1	Gases	2	10/6/21	10
2	Kinetics	5	10/20/21	10
3	Equilibrium	7	11/10/21	10
4	PH Review	8	11/13/21	10

E. Attendance and withdraws:

Attendance at every meeting is required and will be counted towards your grade.

F. Grading:

Connect Homework	120	Points
Exams	330	Points
Final exam	250	Points
Lab Grade	300	Points
Lab Exams	(140)	
Lab Reports	(120)	
Lab participation	(40)	
<hr/>		
Total	1000	points

885+ pts A

785+ pts B

650+pts C

500+pts D

**\*\*\*The grading in this course will follow what is written in this syllabus and according to the scale listed above.** From time to time I will show a spreadsheet summarizing your grades. It is **your responsibility** to let me know the discrepancies so I can make corrections as soon as possible. **Please note that all the single relevant grades recorded in Canvas are correct and will be exported to this spreadsheet. As a precaution though, don't trust your grade total, %, or the A, B,C etc. listed in Canvas.**

The best way to figure out how you are doing in the class is to calculate how many points you have lost by subtracting your scores from the maximum possible points for each exam or assignment and deduct it from 1000 points. The worksheets are extra points which may be used to make up for the points you've lost. Then, by the point standard above you can figure out how many points you can afford to lose and still get your desired grade. For example, if you have lost total 90 points, to get an "A", you can only lose 30 more points; but if you have a perfect score on 3 worksheets (10 points each), then you may lose a total of 60 points still get an "A".

**G. "Getting acquainted" Zoom meeting:** You are required to attend a short "Getting Acquainted" zoom meeting so that I get to know you - your goal, your expectation or any hardships.

**It will be 9/22/21 and 9/27/21** Lab Asynch hours: 4:00-5:00 PM

It's divided into 10 minute slots, maximum 3 students per slots. Just go to Canvas course, click "Find Appointment", you will see all the available appointments. Sign up for any of the 10 minutes slots. Attend the meeting with your camera on. Meeting ID: 2038756594 (the same as my office hour meeting ID).

H. For Chem 1B we cover the following chapters in this order Chapter 5, Chapter 12, Chapter 16, Chapter 17, Chapter 18 and Chapter 20.

**To do well in the course You should:.**

- (1) Read each chapter carefully before coming to class. Not every detail will be covered in lecture, but you are still expected to understand the whole chapter.
- (2) As you read the chapter, attempt to do the in-chapter sample and follow up problems and the corresponding end-of chapter practice problems. In fact the "Connect assignments are selected problems from the end of the chapter problems. The exam questions will often be very similar to the problems mentioned above; therefore, make sure you can do all of these problems comfortably before an exam. Do the Connect homework in a timely manner will help you do well in class.
- (3) **DO NOT FALL BEHIND WITH THE READING OR HOMEWORK!!** This is the number one mistake you can make. Concepts in chemistry are like building blocks. Initially, you learn one topic to build up to larger concepts. If you are shaky on a topic early on, your whole foundation will be unstable. To avoid this, try to read ahead of the scheduled lecture topics and keep up with the homework.

I. **Laboratory** There are total **10 labs. 4 virtual labs and 6 HOL labs. The virtual labs are group assignments.** You will be assigned to a groups of 3 students and you can go to the breakout rooms for discussion and help each other; however, each student needs to submit his own report to get a grade and the report can not be a photo copy of other student's work.

Each laboratory experiment must be completed within the specified time. When that period is over, no credit will be given for the lab. All lab work not conducted will be graded as a zero.

WEEK	DATES	LECTURE	LABORATORY
1	9/20/21 (M)	Ch 5 Gases – 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	INTRO/Connect HOL Registration/ Introduction
	9/22/21 (W)	Ch 5 <b>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	Review- VSEPR/molecular shape/polarity Complete <b>Academic Integrity Contract</b>
2	9/27/21 (W)	<b>Review, Molecular shape/ 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>	Review- VSEPR/molecular shape/polarity/orbital hybrid (Report 1)
	9/29/21 (W)	Ch 12 <b>Phase diagrams</b> , phase changes: melting, freezing, evaporation, condensation, sublimation, deposition; heat of fusion, heat of vaporization; heating-cooling curves	<b>Phet simulation</b> <b>Gas Properties (Report 2)</b>
3	10/1/21 (M)	Ch 12 continue - crystalline versus amorphous solids; crystal lattices; unit cells: simple cubic, body-centered cubic, face-centered cubic semiconductors, and insulators; liquid crystals	3 <b>HOL1 – Getting started</b> (Report
	10/6/21 (W)	Ch16 <b>Kinetics</b> – Reaction rate, Rate Law, determining the reaction order and rate constant <b>experimentally</b>	<b>HOL2-Lab Safety</b> (Report 4)
4	10/11/21 (M)	<b>Exam 1 •</b>	
	10/13/21 (W)	Ch16 <b>Rate laws Integrated Rate Laws</b> , concentration changes over time, <b>half life</b>	HOL3- Boyle’s Law(1)(Report 5)
5	10/18/21 (M)	Ch16 Theories of Chemical kinetics - <b>Collision theory, Arrhenius equation, Transition state theory, activation energy, reaction energy diagram, Catalysts</b>	HOL3- Boyle’s Law (2)
	10/20/21 (W)	Ch16 <b>Reaction mechanisms</b> –reaction steps from reactants to products, Elementary steps, molecularity, Rate determining steps (RDM), intermediates. The over-all reaction, the rate law	HOL4-Kinetics (1) (Report 6)
6	10/25/21 (M)	Ch17 <b>Equilibrium, Equilibrium constants, and Reaction quotients (similarity and difference between K and Q); Predicting direction of reaction</b> by comparing Q and K	HOL4-Kinetics (2)
	10/27/21 (W)	Ch17 $K_c$ versus $K_p$ , Predicting direction of reaction by comparing Q and K Manipulation of Q or $K$ ’s <b>Solving equilibrium problems</b> – the “ICE” approach	Lab Midterm
7	11/1/21 (M)	Ch17 <b>Solving equilibrium problems</b> – using quadratic equation or simplify the calculation when K is very small or very large. Ch17 <b>Le Châtelier’s Principle</b>	HOL5-Beer's Law (1) (Report 7)
	11/3/21 (W)	Exam 2	HOL5-Beer's Law (2)
8	11/8/21 (M)	Ch18 Definitions of acids and bases: (1) Arrhenius(2) Brønsted-Lowry acid base (proton transfer) (3) Lewis acid base (electron transfer); acid and base dissociation constants ( $K_a$ & $K_b$ ); <b>The pH scale Auto-ionization of water; definition of neutral versus neutralized; pH scale; temperature dependence of neutral pH; <math>pOH</math>; <math>K_w</math></b>	$K_c$ BY SPECTRO 20 (1) (Report 8)

	11/10/21(W) 11/12/21	<b>Ch18 <i>Strong versus weak acids</i></b> , Conjugate acid-base pairs; relative acid strength and direction of neutralization; determining $K_a$ from; relationship between $K_a$ and $K_b$ ; <b><i>Polyprotic acids</i></b> Last day to <a href="#">drop classes</a> with "W"	Kc BY SPECTRO 20 (2)
<b>9</b>	11/15/21 (M)	<b>Ch18 <i>Salts</i></b> - Salts that yield acidic, basic, and neutral solutions; solutions of weakly acidic cations and weakly basic anions; salts of amphoteric	HOL6-Equilibrium and Le Châtelier's Principle(1)(Report (9)
	<b>11/17/21 (W)</b>	<b>Ch20 <i>Spontaneity</i></b> 16.4 <b><i>Free energy</i></b> - entropy; microstates; first, second, and third laws of thermodynamics; standard molar enthalpies; entropy changes in common chemical and physical processes	HOL6-Equilibrium and Le Châtelier's Principle(2)
<b>10</b>	<b>11/22/21 (M)</b>	<b>Ch20 Ch 20</b> Relationship between free energy and equilibrium; free energy outside of the standard state; reaction progress diagrams	Calcium Hydroxide(1))(Report (10)
	<b>11/24/21 (W)</b> <b>11/25-11/28</b>	<b>Exam 3</b> <b>Thanks Giving Holiday school closed</b>	Calcium Hydroxide(2)
<b>11</b>	<b>11/29/21 (M)</b>	<b>Ch20</b> Relationship between free energy and equilibrium; free energy outside of the standard state; reaction progress diagrams	<b>LAB FINAL</b>
	<b>12/1/21 (W)</b>	<b>Ch20</b> Review	
<b>12</b>	<b>12/6/21 (M)</b>	Final	

**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.