Course Syllabus
Foothill College, General Chemistry 1B (5 Units)

Course Information

Course Number & Name:	**CHEM-001B-05**
Section Number:	40371
Semester & Year:	Spring 2017
Lecture(days, time, location):	TTh, 6:00 PM - 7:15 PM, Rm.4603
Lab (days, time, location):	TTh, 7:30 PM - 10:20 PM, Rm.4814
Final Date and Time:	06/27/17, 6:00 PM - 8:00 PM, Rm.4603
Drop Policy:	Drop deadline without a "W" – **Fri**, **Apr 23, 2017**
	Drop deadline with a "W" – **Fri**, **Jun 02, 2017**
Prerequisites:	Chem001A, Advisory: ENGL 905 and READ 961.

Instructor Information

Name:	Ashok Sinha, PhD
Office (days, time, location):	TTh, 4:50PM – 5:50 PM, Rm. 4431
Phone:	408-712-0261
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Web page:	http://www.sinhainstitute.com/Chem1B.php

Course Description: Chemistry 1B is the second of the three quarter length General Chemistry courses. Topics covered in this quarter include gas laws, solution properties, chemical kinetics, chemical equilibria, acid base chemistry and entropy and free energy change. Laboratory parallels the lecture topics.

Required Course Materials

Text: Chemistry, Silberberg & Amateis, 7th ed, McGraw Hill, 978-0-07-351117-7
A scientific or graphing calculator: TI–83, –84 or –86 recommended for lecture and lab. The chemistry stockroom has calculators available for checkout during lab time only, not for your use during the quarter.
1B experiments and handouts. These are downloaded and printed by you from class website: http://www.sinhainstitute.com/Chem1B.php
A copy of LoggerPro software: Download from the class website: http://www.sinhainstitute.com/Chem1B.php

Laboratory Notebook: Hayden-McNeil CARBONLESS. (Bookstore). Do not purchase a notebook with BLUE pages – too hard to read!

Safety goggles (not glasses) or Visorgogs® (Bookstore).

Online Homework:
Connect+ with LearnSmart is a web-based tutorial/homework program. A significant portion of your overall grade will be based upon the use of this software. Therefore, access is required! Expect to spend an average of about 5 hours a week on the online homework. The access code is specific for the textbook, is valid for 18 months and follows you from course to course (Chemistry 1A to 1B to 1C). You only need one access code. You can purchase access separately online from the publisher, McGraw-Hill. Each assignment will indicate the due date and have a link detailing the grading settings for the assignment. Your homework grade will be 1/3 LearnSmart and 2/3 Problem Solving.
Web address for LearnSmart: http://connect.mheducation.com/class/fh-chem1b-sp17-sinha5

Student Learning Outcomes: After completing the class:

1. You will demonstrate an understanding of the principles of scientific inquiry.
2. You will apply the scientific method in lab experiences to interpret information and draw conclusions.
3. You will demonstrate the ability to think critically and employ critical thinking skills.
4. Youwill be able to read and interpret graphs and data.
5. Youwill demonstrate the quantitative skills needed to succeed in General Chemistry.
6. Youwill demonstrate an understanding of the impact of science on society.

Points to be earned: Points will be earned based on two exams and a final, two lab quizzes, online homework, lab reports, lab techniques and attendances. There will be no makeup exams under any circumstances. Absence from the final will result in a failing grade in the class. Exams will be, if not mentioned otherwise with short questions, multiple choice (on scantron form 882E) and/or True/False format. Quiz will be multiple choice (on scantron form 882E) and/or True/False format. Students will lose one (1) point per absence from the next midterm exam if they are late to attend a class within 10 minutes of the start time. They will need to initialize sign-up sheet for their attendance records.

Grade Computation: Grading will be based upon three integrated exams and a comprehensive final. When computing course grades, each student's overall percentage will be determined from the following:

3 Exams (20% each)	60 %
2 Quizzes (6% each)	12 %
Online Homework	13%
Lab Reports	13 %
Lab Techniques, Participation	2%
Total	100%

If your 2nd midterm score is better than 1st midterm, then 2nd midterm score will be exchanged (once) as 1st midterm score. Same rule will apply for 2nd and the final exam score. But an earlier midterm score won't exchange for a later exam score.

Letter grades will be assigned on a percentage scale:

Letter Grade	A+ ≥ **97%**	A ≥ **93%**	A- ≥ **90%**	B+ ≥ **87%**	B ≥ **83%**
	B- ≥ **80%**	C+ ≥**75%**	C ≥**68**±1**%**	D ≥ **60%**	F < **60 %**

If you fail (< 60 %) either the lecture or laboratory portion of the course you will not receive a passing grade.

Final cut-off percentages will be determined after all points for lecture and laboratory have been totaled.

Text Coverage:

Text Coverage	Key Concepts	Notes
Ch. 5	Gas Behavior; Ideal Gas Equation; Kinetic Molecular Theory; Behavior of "Real Gases"	This chapter is a good example of the Scientific Method: observations, laws, hypothesis and theory. Conceptual understanding AND mathematical problem solving will be emphasized.
Ch. 12.1 – 12.7	Intermolecular Forces; Properties of Liquids; Properties of Water;	You may need to review topics from Chapters 10 & 11: specifically concepts of

	Classification; Structure; Types and Properties of Solids; Advanced Materials.	ionic and covalent bonding, Lewis Structures, molecular shapes, molecular polarity. Some of this will only be covered in lab.
Ch. 16	Chemical kinetics; Factors Effecting Reaction Rates; Rate Laws; Collision Theory; Mechanisms.	Conceptual understanding AND mathematical problem solving will be emphasized. You will need to be able to use/manipulate logarithms and antilogarithms.
Ch. 17	Introduction to Chemical Equilibria; Equilibrium Constants; Factors affecting Equilibria.	Prior understanding of stoichiometry is a MUST. Conceptual understanding AND mathematical problem solving will be emphasized. You will need to be able to solve quadratic equations.
Ch. 18	Acids & Base; pH Scale; Acid/Base Equilibria; Chemical Structure and Acid/Base Behavior	Prior understanding ofacid/ base definitions/reactions (Chapter 4) and of chemical equilibria (Chapter 15) is a MUST. Conceptual understanding AND mathematical problem solving will be emphasized.
Ch. 20	Introduction into Chemical Thermodynamics; Concepts of Entropy, Gibbs Free Energy and Spontaneity; Connection Between Thermodynamics and Equilibria.	You will need to read this Chapter more than once! Reading ahead of lecture is a MUST! Prior to this chapter you should review the concepts of ΔH, state functions, Hess's Law and the First Law of Thermodynamics (Chapter 5).

BEFORE the beginning of Chemistry 1B I expect you to KNOW OR BE ABLE TO DO the following:

tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}

Units: mass-gram (g) length-meter (m) Time-second (s) volume-liter (L)
Density (g/mL for liquids and solids, g/L for gases)
Solution concentration in molarity, M = moles solute/L solution
1 mL = 1 cm3
˚C to K conversions: K = 273.15 + ˚C and ˚C = K – 273.15
The difference between precision and accuracy and how to calculate percent error.
Record a measurement to the correct digit (precision) based upon the limitation of the measuring device.
Determine the correct number of significant figures allowed in the result of a calculation.

The basic nuclear structure of the atom (protons, neutrons and electrons).
Locate metals and nonmetals, alkali metals, alkaline earth metals, halogens and noble gases, periods and groups, atomic numbers and atomic weights on the Periodic Table.
The difference between ionic and covalent bonding (Be able to recognize if a substance is ionic or molecular in nature.).
Name and write formulas for ionic compounds, binary molecular compounds and acids. You should know the names and formulas of the common polyatomic ions used in 1A.
MEMORIZE the common metric (SI) prefixes and convert between them quickly and efficiently.
The 7 strong acids: HCl, HI, HBr, HNO_3, $HClO_4$, $HClO_3$, H_2SO_4
The strong soluble bases (Group 1A Hydroxides and $Ba(OH)_2$) and strong slightly soluble bases ($Ca(OH)_2$ and $Sr(OH)_2$)
Ammonia (NH_3) is a weak base.
Write ionization equations for strong and weak acids and bases in water.
Selected solubility rules for ionic salts (see website).
Convert between mass and moles. Balance chemical equations. Perform stoichiometric calculations including those needed for
Titration, limiting reactant and percent yield problems.
Recognize types of chemical reactions (precipitation, acid-base and redox). Write net-ionic equations for various types of reactions.
Dilution calculations. C1V1 = C2V2
The First Law of Thermodynamics and the definition of ΔHsys.
Standard states for thermochemistry: 1 atm for gases, 1M for aqueous solutions, most stable form for pure substances.
Hess' Law: $\Delta H^\circ rxn = \Sigma \Delta H^\circ f$ (products) – $\Sigma \Delta H^\circ f$ (reactants) (This will also be used for ΔS° and ΔG°)
The shapes of atomic orbitals (s and p).
Write electron configurations.
Periodic Table: trends in atomic size, ionization energy, electron affinity and ion sizes.
Draw Lewis structures for molecular compounds and polyatomic ions.
Determine shapes of molecules and ideal bond angles using the VSEPR Model.
Understand the concepts of bond polarity and dipole moments and be able to determine if a molecule is polar or non-polar.
Understand the Valence Bond Theory description of covalent bond formation: orbital overlap, orbital hybridization, sigma and pi bonds, single and multiple bonds.

RESOURCES

See your instructor regularly during office hours for help. Do not wait until the day or even the week before a test!
PSME Center: http://www.foothill.edu/psme/center.php
Disability Resource Center: If you have a learning disability make sure you go through the Foothill DRC and keep me informed.To obtain disability-related accommodations, students must contact Disability Resource Center (DRC) as early as possible in the quarter. To contact DRC, you may:
• Visit DRC in Room 5400.
• Email DRC at adapUvelearningdrc@foothill.edu
• Call DRC at 650-949-7107 to make an appointment. Please ask to speak with Akosua Grant, Accommodations Coordinator.
If you already have an accommodation notification from DRC, please contact Teresa Ong privately to discuss your needs.
Other Students

Help each other to learn (not copy!)
Lab is a great time to get to know and help each other. Study groups can be a great support!
Check your knowledge of the material by doing the assigned online homework!

Rules of Conduct

- All students attending the class must be officially registered to sit in the class.

- Students with disabilities will be accommodated by the Disabled Student Office. Please contact your instructor for additional help you may need or difficulties you are encountering.

- This is a fast-paced and challenging course, attending the class regularly will help you to understand the material and pass the class. Instructors may drop students from class if they fail to attend the first two weeks of class based on the state law. So attend lectures regularly. Lectures provide an opportunity to ask questions and help to direct study of the textbook for exams. Repeated absences from lecture typically lead to poor performance. Many problems similar to the ones discussed in the class show up in the exam.

- No make-up exams will be given. Please make sure to attend regular exams.

- Dropping the class is student's responsibility and you must drop by the stipulated deadline. No request to drop the class after that deadline (Friday, Feb 26, 2016, drop with a W) will be allowed. A student should drop the class officially; otherwise the student would be assigned an "F" grade – no exceptions.

- If you miss two consecutive weeks of labs without any valid reasons, you will be asked to drop the class.

- Academic Dishonesty will not be tolerated in any form. Penalties for cheating include failing marks and possible expulsion. Allowing another person to copy your work constitutes academic dishonesty, and will be treated as such.

- Please practice common courtesy during lecture. Be prompt, turn off your cell phone or pager, and save any comments or questions for relevant discussion with the entire class. Save your snacks/lunch for breaks.

- Prepare for class in advance. You'll make the most of lectures and save everyone time during question/answer periods if you review the chapter briefly before class.

- Take advantage of office hours for clarification of ideas and/or discussion of specific questions. Schedule a private meeting (via email) if needed. Suggestions or concerns are welcomed during office hours as well.

- **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. Check with the lab instructor for specific directions.

8. LABORATORY SYLLABUS

LABORATORY LECTURE:

The beginning of each laboratory session is designated as a laboratory lecture period for which you must be on time in order to perform the scheduled experiment. In addition to arriving to class on to, you are also required to:

- Read and understand both the background information and the procedure BEFORE coming to the laboratory
- Complete any prelab assignment prior to class time

The instructor will use this lecture period to outline important details of the procedure, overview theory and calculations, and emphasize safety hazards and proper chemical disposal. If you repeatedly fail to comply with the procedures for proper chemical disposal, then you will be dropped from this course.

LABORATORY EXPERIMENTS:

Scheduled experiments are conducted in Lab 4814 following the laboratory lecture time.

LABORATORY CHECK-IN:

Lab check-in is on the 2nd day of the class. If you drop this course, then ***you*** must arrange to check-out with the instructor to get your deposit back ***before Finals Week***. You must be present in the lab check-out date to check out of the lab. Failing to do so will result in 20% reduction of your total lab points.

LABORATORY SAFETY AND PREPARATION:

Laboratory safety will be discussed in the mandatory first lab session. It is expected that you put safety first in the laboratory, and if you deliberately neglect the directed safety rules, then you will be dropped from this course.

LABORATORY DESCRIPTION and GRADING CRITERIA

1. For grading purposes the lab activities are divided into EXPERIMENTS and WORKSHEETS.

1.1. An EXPERIMENT activity consists of:

• Notebook preparation: REQUIRED (see below). Signed by me if submitted on time.
• Collection and presentation of data in your notebook (see below)
• The quality of the completed report sheet
• Attendance and participation during data analysis day(s) (if scheduled)

1.2. A WORKSHEET activity consists of

• Attendance
• The quality of the completed worksheet

2. Lab Notebook Preparation (The Notebook Duplicate): For all EXPERIMENT activities you will submit the duplicate of your notebook preparation BEFORE lab lecture begins, no later than 5 minutes into the laboratory for full credit. This will usually be one or two pages that include: a title, reagents, safety and an outline of the procedure. I will sign these duplicates (full credit) if they are on time.

3. Collection and Presentation of Lab Notes and Data on Duplicate(s): In lab, make sure you have taken lab lecture notes and data collection is complete. You will hand-in the duplicates in the next week's lab. In this assessment, I will be looking for overall organization, correctness, and completeness of your notes and data with a date and a signature ON ALL PAGES! Mistakes during data collection should be indicated out with a

single line through the data. All writing must be legible. INCLUDE UNITS on all data, graphs, calculations, etc…! Late data pages will be downgraded.

4. When submitting a lab activity for grading, a cover sheet must be attached to aid in the organization and grading of the submitted work.

IMPORTANT: An EXPERIMENT activity will not be graded if the notebook preparation has not been submitted. You must submit a notebook preparation (signed if on time, or late for partial credit) to have a wet lab activity graded.

5. Due dates and Late Policies

5.1. For some experiments, you may be collecting and sharing data with a partner; however you must do your own calculations, formulate your own conclusions and turn in your own report for each experiment. If students are found to have copied from one another, points will be deducted from the grade or a grade of zero will be given for ALL students involved!

5.2. If you miss an experiment during your scheduled laboratory session, then you may only make-up the experiment during an alternate laboratory session of the SAME experiment with the instructor's permission. If you are absent for an experiment and are unable to make it up, then you may turn-in the lab report/worksheet for partial credit.

5.3. For grading purposes, lab activities can be turned in a maximum of one lab period late. One lab late is a 15% penalty. The report or worksheet cannot be turned-in for credit after this time.

Checklist for Completed Lab Reports/Worksheets

1. Include a cover page! All papers must be stapled together with a cover page! (No paper clips, no bent corners, etc.) Loose papers will not be accepted and if you do turn them in, points will be deducted! Turn-in only what is asked for, no extra pages.

2. The written lab report or assignment should be neat. Use pencil or pen.

3. Unless otherwise notified by your instructor, all exercises and problems in a lab report or assignment must be completed for full credit. If you are having trouble solving a problem see your instructor or go to the PSME center for help. Do not copy another students work, both you and the other student will be penalized!

4. In all calculations show the set-up with units! If multiple trials are performed, you only need to show the set-up for the first trial.

5. All data must be recorded to the precision of the instrument. If you are unsure of the precision ask your instructor. For example, a buret reading where the meniscus falls exactly on 15 mL is recorded as 15.00 mL not 15 mL. The trailing zeros in the 15.00 mL reading are significant.

6. In your calculations use the rules of significant figures. Review the rules for significant figures! Points will be deducted for every significant figure error. This is chemistry 1B, you should know how to use significant figures in calculations!

FH Chem1B Schedule (Tentative); Spring 2017: Dr. Sinha

		Tuesday		Thursday	
Week	Date Begins	**Lecture 06:00 pm-07:15pm Rm. 4603**	**Lab 07:30 pm-10:20pm Rm. 4814**	**Lecture 06:00 pm-07:15pm Rm. 4603**	**Lab 07:30pm-10:20pm Rm. 4814**
1	Apr 11	Intro to Class	Introduction to Lab Safety, and Lab Notebook **MANDATORY**	Ch. 5 (Gas Behavior)	Chem 1A Review, Drawer Check-In
2	Apr 18 (*)	Ch. 5 (Gas Behavior)	**Experiment (Notebook Prep Due)** Gas Behavior	Ch. 5 (Gas Behavior)	Gas Behavior Data Analysis (**Bring Laptops/Logger Pro**)
3	Apr 25	Ch. 12 (Intermolecular Force)	**Experiment (Notebook Prep Due)** ΔH fusion of Water	Ch. 12 (Intermolecular Force)	**Experiment (Notebook Prep Due)** Investigating Intermolecular Forces
4	May 2 (**)	Ch. 12 (Intermolecular Force)	**Worksheet** Crystal Lattices and Unit Cells	Ch. 12 (Intermolecular Force)	Finish Crystal Lattices Worksheet; **Lab Quiz-1**
5	May 9	**Test # 1 (Ch.5, 12)** Ch. 16 (Chemical Kinetics)	**Experiment (Notebook Prep Due)** Crystal Violet Kinetics Data Collection.	Ch. 16 (Chemical Kinetics)	Crystal Violet Data Analysis **Bring Laptops**
6	May 16	Ch. 16 (Chemical Kinetics)	**Experiment (Notebook Prep Due)** Iodination of Acetone Kinetics	Ch. 17 (Chemical Equilibria)	Iodination of Acetone Kinetics Data Analysis Bring Laptops
7	May 23	Ch. 17 (Chemical Equilibria)	**Experiment (Notebook Prep Due)** Chemical Equilibrium: Finding a Constant, Keq	Ch. 17 (Chemical Equilibria)	**Kinetics and Equilibrium Review**
8	May 30 (***)	Holiday	No Lab	Ch. 18 (Acid-Base Equilibria)	Experiment (Notebook Due) Acids, Bases & Equilibrium

9	Jun 6	**Test # 2 (Ch.16, 17)**	Acids, Bases, and Equilibrium Data Analysis	Ch. 18 (Acid-Base Equilibria)	**Lab Quiz-2; Start Worksheet** Thermodynamics & Equilibrium
10	Jun 13	Ch. 20 (Thermodynamics)	**End Worksheet** Thermodynamics & Equilibrium;	Ch. 20 (Thermodynamics)	**Experiment (Notebook Prep Due)** Equilibrium & Thermodynamics
11	Jun 20	Ch. 20 (Thermodynamics)	Equil & Thermo Data Analysis **Bring Laptops & Locker Check Out**	Chapter make-up & Review	**Final Exam Review**
12	Jun 27	**Final Exam (Ch.18, 20)**	No Lab	No Class	No Lab

***** Last week to drop without a grade (Sun, Apr 23)
**Last week for Pass/Fail (Fri, May 05)
***Last week to drop with a W (Fri, Jun 02)