Course Syllabus

Edit

*This is a tentative syllabus. With the changes being made because of COVID-19, there may be significant changes throughout the semester.

Syllabus for Chem 1B: General Chemistry
Reedley College

Section: 55036

Term: Fall 2021

Course Information

Lecture: Online (asynchronous)

Required Books and Materials:

- Chemistry: A Molecular Approach, Nivaldo J. Tro
  - 3rd to 5th editions are acceptable. Newer editions will match the lectures most closely. Homework has been selected for each edition (posted on Canvas).
- The lab manual will be provided as a free download from Canvas. Experiments and worksheets must be printed out and brought to class.
- Composition Notebook for Lab.
- Lab coat and goggles for face-to-face labs.
- Scientific calculator (I recommend the TI-36X Pro)

Faculty Information

Instructor: Kirk Kawagoe
Office and phone: **MSCI** (Math and Science) 222
Cell phone: (559) 393-2121 (**text only**, this is the best method of contacting me). I will usually get back to within the hour (or faster).
email: Use the canvas e-mail system. I will get back to you within 24-hours. Do not use my RC email.
Office hours: Tuesday 12:30-1:30 PM Zoom (by appointment), Friday's 10-2 PM MSCI 201 (your lab room)

Lab: Tuesday, Thursday. MSCI 201 2 PM-4:20PM

Statement on Academic Dishonesty:

Academic Dishonesty

Accommodations

It is our policy not to discriminate against any student. If you suspect that you have any type of physical disability or learning disability that is relevant to your performance in the course, please stop by the disabled student services office and discuss it with them as they may be able to provide services and support that could help you succeed.

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

Attendance

This is an hybrid class. Lab attendance will be taken in class. Lecture attendance is based on assignments turned in. If you don't otherwise contact me, you may be dropped if:

- You don't turn in the assignments due on (8/14) by the end of the second week.
- Don't take the first exam.
- Don't turn in 70% of assignments given by the end of week 9. I make exceptions if students contacted and worked out a plan to successfully catch up.

Important dates

- Veteran's Day 11/11 (Thursday)
- Thanksgiving 11/25 (Thursday and Friday are school holidays)
- Final Exam - Thursday, 12/9/21, 2 PM-3:50 PM: 2 hour, in-person Final exam

Exams

Five exams are given in this class. They are a combination of multiple choice and written problems based on the study guides and homework. Make up exams will generally not be given. Most constants, conversion factors and equations will be provided on exams. Examples of information given can be found on Canvas.

Course Student Learning Outcomes and Objectives

The link above displays the objectives and outcomes for this course.

Extra Credit

Extra credit assignments will not be given.

Grading

A summary of your grades, including a projected course grade, is available on Canvas. To receive a passing grade, you must have at **least a 70% lab average and a 65% exam average** regardless of your success in the rest of the course.

The grading scale will be based on a straight percentage:

- A = 90% - 100%
- B = 80% - 89%
- C = 70% - 79%
- D = 60% - 69%
- F = 0% - 59%

The final grade will be calculated using weighted categories:

- 10% Homework
- 25% Lab reports/worksheets. You must receive at a 70% average in lab to pass the course.
- 45% Chapter Exams. Your exam average must be at least 60% to pass the class with a grade of C or better.
- 20% Final Exam

Homework

Here's a general outline of how you should work out homework problems involving calcuations:

1. **Find what you are looking for and the givens.**
2. **Determine how the values are related. (i.e. conversion factors or equations)**
3. **Write what you are looking for on the left of the equal sign**
   - **If there are conversions, show each conversion factor with its units. Cancel units.**
   - **If its an equation, solve the equation for the variable you are looking for.**
4. **Carry out conversions or plug values into equations making sure that units match.**

Example:

Calculate the volume, mL, of 35.3 g of mercury at 25°C. (d = 13.593 g/cm^3)

Looking for mL Hg.

Given: 35.3 g and d = 13.593 g/cm^3

Plan:

$$\mathbf{g} \xrightarrow{d=13.593\,g/cm^3} \mathbf{cm^3} \xrightarrow{1cm^3=1mL} \mathbf{mL}$$

Work shown:

$$volume(mL) = 35.3\,\cancel{g} \times \frac{1\,\cancel{cm^3}}{13.593\,\cancel{g}} \times \frac{1\,mL}{1\,\cancel{cm^3}} = 2.5969\,\text{mL} = 2.60\,\text{mL}$$

Homework is due following the completion of the chapter and graded according to the following scale:

- 60% - Showing work for questions requiring work.
- 20% - Providing accurate answers.
- 20% - Organization and significant figures.

Lab

Lab work will follow as closely as possible the material discussed in the lectures. There is no published lab manual for this course. All the lab assignments and experiments are available on Canvas.

For Face-to-Face labs there are **two different prelab assignments**. Both need to be completed **before coming to *class*** to do an experiment.

- **If there is a prelab video, you need to watch it and complete a quiz before coming to class.**
- **Prelab Worksheets** – These are found ***in*** the lab instructions you download from Canvas. Most of the questions can be answered by reading the experiment or the introduction to the experiment.
- **Notebook** – You need to write out the following in your notebook ***before you come to class. Use a pen!***
  - Purpose
  - Materials
  - Hazards
  - Procedure (For Chem 1A, you are allowed to bring a copy of the procedure at the beginning of the semester, but you must work from the procedure in your notebook. If important information is missing, you can refer to and supplement your prelab notes).
  - You should also leave space in your notebook for recording data. We will discuss this more in class.

If the notebook work is not done before class, you will not be allowed to do your experiment for the day. You will receive a zero for that day.

For online/video experiments:

- Download the experiment file
- Complete the prelab assignment as if it were face-to-face
- View the video
  - Record the data into your notebook
- Complete and postlab calculations and assignments.

- Submit the file back to the assignment link by the due date.

Late Work

Points are deducted for each day the assignment is late up to 50% (5% per day). Assignments can be turned in at any time during the semester but will have a grade of zero until they are graded. Late assignments run the risk of not being graded if too many are turned in at the end of the semester.

Success in Chemistry

- Do not underestimate the time required for this class.
- Do not fall behind. Chemistry is cumulative and builds upon earlier concepts.
- Try and read ahead of the class schedule. Work through the examples in the text. Take notes while watching lecture videos.
- Check in EVERY DAY.
- Study for understanding. Critical thinking is a requirement for success in Chem 3A.
- Always show your work, including all units and considering significant figures.
- Complete and turn in all assignments. Work extra problems.
- Consider forming a study group.
- Ask for help. Text or email me with questions any time (literally). I will reply at my earliest convenience.

Course Student Learning Outcomes and Objectives

Overview

The Course Description, Learning outcomes, and learning objectives describe the material and skills covered in this course. You should make a copy of this page for your records. It 1) allows other institutions to translate this course to one of their courses for the purposes of transfer; and 2) gives you a broad understanding of the material you need mastery in to successfully complete this course. However "knowing" everything in the accompanying page does not necessarily guarantee passing the course if you do not turn in assignments and do well on exams!

COURSE DESCRIPTION

***5 units**. 3 lecture hours, 6 lab hours. (A, CSU-GE, UC, I)*

Course Description: This course completes the yearlong general chemistry sequence (1A-1B) and covers the principles of physical and inorganic chemistry with an emphasis on quantitative, mathematical problem solving. Topics covered include acid-base theory, chemical kinetics, equilibrium (acid-base, hydrolysis, and solubility), chemical thermodynamics, electrochemistry, selected topics in nuclear chemistry, coordination chemistry, and/or chemistry of selected groups. Students will analyze inorganic

compounds qualitatively and quantitatively. (A, CSU-GE, UC, I) (C-ID CHEM 120S: CHEM 1A & CHEM 1B)

Prerequisite: Chemistry 1A and **Mathematics**

103 or equivalent*.

Advisories: English 1A.

Course Objectives for CHEM 1B:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

1. use chemical kinetic mathematical operations to determine order and rates of a reaction and understand the effects of temperature;
2. apply Le Châtelier's Principle to systems displaced from equilibrium, mathematically solve for the equilibrium constant, and describe limitations involving the equilibrium constant
3. demonstrate the ability to classify acids and bases and then determine equilibrium constant and pH of acids, bases, and buffers;
4. solve problems involving the common-ion effect in acid-base and solubility equilibria;
5. evaluate neutralization reactions and titration curves;
6. recognize fractional precipitations and equilibria involving complex ions;
7. recognize the concept of qualitative cation analysis and be able to perform related laboratory experiments;
8. solve simple problems involving chemical thermodynamic problems (work, heat, internal energy, enthalpy, entropy, and free energy);
9. examine the Second Law of Thermodynamics and apply to the spontaneity of a reaction and the complexity of natural systems;
10. discuss concepts of an electrochemical cell and mathematically solve for a standard cell potential, change in standard free energy, and equilibrium constants;
11. recognize physical and chemical properties of element groups (e.g. alkali metals; alkaline earth metals, transition elements, group 13 metals, group 14 metals, nonmetals including halogens, and noble gases);
12. identify and describe the bonding of complex ions and coordination compounds;
13. discuss general concepts of nuclear chemistry (e.g. stability, decay, fission, fusion, radioactivity, and nuclear reactions);
14. perform laboratory procedures and techniques used in semimicro qualitative and quantitative analysis of simple inorganic ions, and the apparatus and measurements used in simple calorimetry and electrochemistry experiments

15. demonstrate skills in the laboratory in the use of the analytical balance, titration, spectroscopy, pH meter, glassware, melting point apparatus, safety precautions and general laboratory procedures

STUDENT LEARNING OUTCOMES

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

1. Solve and explain chemical kinetics and mechanisms problems
2. Solve and explain chemical equilibrium questions including but not limited to acid/base and pH concepts
3. Solve and explain problems on thermodynamic concepts
4. Solve and explain problems on electrochemical concepts
5. Explain the fundamental concepts of nuclear chemistry
6. Demonstrate general chemistry skills in the laboratory including qualitative analysis

Tentative schedule

	Lecture Check Canvas for specific exam dates and times	Important Assignments (For due dates, check canvas calendar) (homework is listed separately)
Week 1 8/8/21	Syllabus Lecture: §15.1-4 (**Chapter 15 Part 1**) • **Week 1**	• Tuesday - Chem 1B Math Review Worksheet **Math Review Worksheet** • Thursday - Continue **Math Review Worksheet**, Lab Safety Lecture • **Week 1 Discussion**
Week 2 8/15/21	Lecture: §15.5-15.7 (**Chapter 15 Part 2**) • **Week 2**	• Tuesday - **Exp 1b – Introduction to Measurements** • Thursday Chapter 15 Review (**Worksheet 15 Chemical Kinetics Review**)
Week 3 8/22/21	Lecture: §16.1-16.3 (**Chapter 16 Chemical Equilibrium Part 1**)	• Tuesday - Exp 15A Iodine Kinetics (**Exp 15a - Iodine Kinetics**))

	• Week 3	• Thursday - Chapter 15 Review (Continued)/Exp 15A Writeup
Week 4 8/21/21	Lecture: §16.6-9 (Chapter 16 Chemical Equilibrium Part 2) • Week 4	• Tuesday - Ex 16a - Chemical Equilibria AND Exp 16a - Writeup • Thursday - Worksheet 16 - Chemical Equilibrium
Week 5 9/5/21	Lecture: §17.1-7 (Chapter 17 Part 1 - Acids and Bases) • Week 5	• Tuesday Prep: Watch and record observations for **Exp 16b BEFORE CLASS.** • Tuesday: Exp 16b writeup. • Thursday: **Exam 1 (Chapters 15 and 16)**
Week 6 9/12/21	Lecture: 17.8-11 (Chapter 17 Part 2 - Acids and Bases) • Week 6	• Tuesday - (Practice Titration TBD) • Thursday - Worksheet 17 - Acids and Bases
Week 7 9/19/21	Lecture: §18.1-18.4 (Chapter 18 Part 1 - Aqueous Equilibria) • Week 7	• Tuesday - Exp 18a (Gen Chem)- Unknown Weak Acid • Thursday - Continue Exp 18a
Week 8 9/26/21	Lecture: §18.5-18.8 (Chapter 18 Part 2 - Solubility and Complex Ions) • Week 8	• Tuesday - Continue Exp 18a • Thursday - Worksheet: Chapter 18 Review
Week 9 10/3/21	Lecture: §19.1-19.10 (Chapter 19 Thermodynamics) • Week 9	• Tuesday - Exp 18c Recrystallization of Sulfanilamide • Thursday - Experiment 18c part 2 Last day to Drop (Friday)
Week 10 10/10/21	• Week 10	• Tuesday - Exp 18b - Molar Solubility of Calcium Iodate • Thursday - **Exam 2 (Chapters 17-18)**
Week 11	Lecture: §20.1-20.9 (Chapter 20	• Tuesday - Exp 18a (Gen Chem)- Solubility & Thermodynamics

10/17/21	Electrochemistry) • Week 11	• Thursday -
Week 12 10/24/21	• Week 12	• OL Worksheet: Chapter 19 Review • FF Lab: Experiment 18c part 2
Week 13 10/31/21	Lecture: §21.1-21.8 (Chapter 21 Nuclear Chemistry)	• FF Exp 17b (Gen Chem)- Qualitative Analysis (practice days). • OL Worksheet: Chapter 20 Review
Week 14 11/7/21	• Week 14	• FF Exp 17b (Gen Chem)- Qualitative Analysis (Lab Practical)
Week 15 11/14/21	Lecture: §24.1-24.2, 26.3-5 (Chapter 26 Transition Metals) Week 15	• OL Worksheet: Chapter 21 Review • Lab Cleaning Day. Exp 17b makeup day. (Tuesday Only)
Week 16 11/21/21	• Week 16	
Week 17 11/28/21	Review for Final (**1A & 1B**) **Chapter 24/26 Group Assignment** Week 17	• Final Exam Review Materials
Week 18 12/5/21	Finals Week Week 18	• Face-to-Face: Comprehensive 1A - 1B final. Do not meet for lab.

*Exp 1b will be done when we know we can have face-to-face labs.

Course Summary:

Date	Details	Due
Mon Aug 9, 2021	Week 1 (https://scccd.instructure.com/calendar?event_id=168810&include_contexts=course_68892)	12am
Fri Aug 13, 2021	Chem GRASP (https://scccd.instructure.com/calendar?event_id=168809&include_contexts=course_68892)	11am to 1pm
Sat Aug 14, 2021	Chapter 15 Homework Part 1 (https://scccd.instructure.com/courses/68892/assignments/1819558)	due by 11:59pm
	Math Review Worksheet (https://scccd.instructure.com/courses/68892/assignments/1819603)	due by 11:59pm
	Week 1 Discussion (https://scccd.instructure.com/courses/68892/assignments/1819553)	due by 11:59pm
Tue Aug 17, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175417&include_contexts=course_68892)	12:30pm to 1:30pm
Fri Aug 20, 2021	Chem GRASP (https://scccd.instructure.com/calendar?event_id=168818&include_contexts=course_68892)	11am to 1pm
Sat Aug 21, 2021	Chapter 15 Homework Part 2 (https://scccd.instructure.com/courses/68892/assignments/1819559)	due by 11:59pm
	Exp 1b (face-to-face) (https://scccd.instructure.com/courses/68892/assignments/1819599)	due by 11:59pm
Tue Aug 24, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175418&include_contexts=course_68892)	12:30pm to 1:30pm
Thu Aug 26, 2021	It's Freezing Cold in the Classroom!!!!!!! (https://scccd.instructure.com/calendar?event_id=179455&include_contexts=course_68892)	2pm to 4:45pm
Fri Aug 27, 2021	Chem GRASP (https://scccd.instructure.com/calendar?event_id=168819&include_contexts=course_68892)	11am to 1pm

Date	Details	Due
Sat Aug 28, 2021	Chapter 16 Homework Part 1 (https://scccd.instructure.com/courses/68892/assignments/1819565)	due by 11:59pm
	Exp 15a - Iodine Kinetics (https://scccd.instructure.com/courses/68892/assignments/1819592)	due by 11:59pm
	Worksheet 15 Chemical Kinetics Review (https://scccd.instructure.com/courses/68892/assignments/1819609)	due by 11:59pm
Tue Aug 31, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175419&include_contexts=course_68892)	12:30pm to 1:30pm
Fri Sep 3, 2021	Chem GRASP (https://scccd.instructure.com/calendar?event_id=168820&include_contexts=course_68892)	11am to 1pm
Sat Sep 4, 2021	Ex 16a - Chemical Equilibria (https://scccd.instructure.com/courses/68892/assignments/1819590)	due by 11:59pm
Mon Sep 6, 2021	Worksheet 16 - Chemical Equilibrium (https://scccd.instructure.com/courses/68892/assignments/1819610)	due by 11:59pm
Tue Sep 7, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175420&include_contexts=course_68892)	12:30pm to 1:30pm
	Exp 16b - Online (https://scccd.instructure.com/courses/68892/assignments/1819593)	due by 11:59pm
Sat Sep 11, 2021	Chapter 16 Homework Part 2 (https://scccd.instructure.com/courses/68892/assignments/1819566)	due by 11:59pm
Mon Sep 13, 2021	Chapter 17 Homework Part 1 (https://scccd.instructure.com/courses/68892/assignments/1819569)	due by 11:59pm
Tue Sep 14, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175421&include_contexts=course_68892)	12:30pm to 1:30pm

Date	Details	Due
	Exp 18b - Molar Solubility of Calcium Iodate (https://scccd.instructure.com/courses/68892/assignments/1819596)	due by 11:59pm
Mon Sep 20, 2021	Chapter 17 Homework Part 2 (https://scccd.instructure.com/courses/68892/assignments/1819570)	due by 11:59pm
	Worksheet 17 - Acids and Bases (https://scccd.instructure.com/courses/68892/assignments/1819611)	due by 11:59pm
Tue Sep 21, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175422&include_contexts=course_68892)	12:30pm to 1:30pm
	Determining the phosphoric acid/sodium hydroxide reaction mole ratio by titration (https://scccd.instructure.com/courses/68892/assignments/1819589)	due by 11:59pm
Mon Sep 27, 2021	Chapter 18 Homework Part 1 (https://scccd.instructure.com/courses/68892/assignments/1819573)	due by 11:59pm
Tue Sep 28, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175423&include_contexts=course_68892)	12:30pm to 1:30pm
Mon Oct 4, 2021	Chapter 18 Homework Part 2 (https://scccd.instructure.com/courses/68892/assignments/1819574)	due by 11:59pm
Tue Oct 5, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175424&include_contexts=course_68892)	12:30pm to 1:30pm
	Exp 18a Unknown Weak Acid (face-to-face) (https://scccd.instructure.com/courses/68892/assignments/1819595)	due by 11:59pm
	Wks 18 - Aqueous Ionic Equilibria (https://scccd.instructure.com/courses/68892/assignments/1819605)	due by 11:59pm

Date	Details	Due
Tue Oct 12, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175425&include_contexts=course_68892)	12:30pm to 1:30pm
Fri Oct 15, 2021	Chapter 19 Homework (https://scccd.instructure.com/courses/68892/assignments/1819577)	due by 11:59pm
Tue Oct 19, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175426&include_contexts=course_68892)	12:30pm to 1:30pm
Tue Oct 26, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175427&include_contexts=course_68892)	12:30pm to 1:30pm
	Exp 19a Solubility & Thermodynamics -- Online Version (https://scccd.instructure.com/courses/68892/assignments/1819598)	due by 11:59pm
Thu Oct 28, 2021	Wks 19 - Thermodynamics (https://scccd.instructure.com/courses/68892/assignments/1819606)	due by 11:59pm
Tue Nov 2, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175428&include_contexts=course_68892)	12:30pm to 1:30pm
	Exp 18c Recrystallization of Sulfanilamide (https://scccd.instructure.com/courses/68892/assignments/1819597)	due by 11:59pm
	Experiment 18c part 2 (https://scccd.instructure.com/courses/68892/assignments/1819601)	due by 11:59pm
Fri Nov 5, 2021	Chapter 20 Homework (https://scccd.instructure.com/courses/68892/assignments/1819580)	due by 11:59pm
Sat Nov 6, 2021	Exp 20b Electrochemistry -- Online Version (https://scccd.instructure.com/courses/68892/assignments/1819600)	due by 11:59pm
Mon Nov 8, 2021	Wks 20 - Electrochemistry (https://scccd.instructure.com/courses/68892/assignments/1819607)	due by 11:59pm

Date	Details	Due
Tue Nov 9, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175429&include_contexts=course_68892)	12:30pm to 1:30pm
Thu Nov 11, 2021	Exp 17b - Qualitative Analysis (Lab Practical) (https://scccd.instructure.com/courses/68892/assignments/1819594)	due by 11:59pm
Tue Nov 16, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175430&include_contexts=course_68892)	12:30pm to 1:30pm
Mon Nov 22, 2021	Wks 21 - NChem Study Guide (https://scccd.instructure.com/courses/68892/assignments/1819608)	due by 11:59pm
Tue Nov 23, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175431&include_contexts=course_68892)	12:30pm to 1:30pm
Fri Nov 26, 2021	Chapter 21 Homework (https://scccd.instructure.com/courses/68892/assignments/1819583)	due by 11:59pm
Tue Nov 30, 2021	Chem 1B Tutorial (https://scccd.instructure.com/calendar?event_id=175432&include_contexts=course_68892)	12:30pm to 1:30pm
Fri Dec 3, 2021	Chapter 26 Homework (https://scccd.instructure.com/courses/68892/assignments/1819586)	due by 11:59pm
Thu Dec 9, 2021	Curved Final Score. (https://scccd.instructure.com/courses/68892/assignments/1819588)	due by 3pm
	Lab Days Survey (Section 55095) (https://scccd.instructure.com/courses/68892/assignments/1819549)	
	Lab Days Survey (Section 55096) (https://scccd.instructure.com/courses/68892/assignments/1819548)	