

Instructor: Mr. J. Patrick Sparks
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<http://www.csus.edu/faculty/S/jpsparks/index.html>

Office Hours: Mon 2:00 to 3:00 in SQU 502, Tue 11:00 to 12:00 in SQU 530
and Thur 11:00 to 12:00 in SQU 530.

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|----------------|----|-------|-----|----|----------|-----------------|------------------|
| Course: | 01 | 83909 | LEC | TR | MRP 1000 | 1:30 to 2:45 pm | Mr. J. P. Sparks |
| | 02 | 83910 | LAB | MW | SQU 426 | 11:00am-1:30pm | P. Sparks |
| | 03 | 83911 | LAB | MW | SQU 426 | 2:00pm-4:30pm | K. Smith |
| | 04 | 83912 | LAB | MW | SQU 426 | 5:00pm-7:30pm | R. Brookins |
| | 05 | 83913 | LAB | TR | SQU 426 | 7:30am-10:00am | K. Smith |
| | 06 | 84165 | LAB | TR | SQU 426 | 10:30am-1:00pm | K. Smith |
| | 07 | 84206 | LAB | TR | SQU 426 | 3:00pm-5:30pm | E. DeAnda |
| | 08 | 84295 | LEC | TR | SQU 316 | 9:00am-10:15am | Mr. J. P. Sparks |
| | 09 | 84296 | LAB | TR | SQU 428 | 10:30am-1:00pm | J. Houston |
| | 10 | 84297 | LAB | TR | SQU 428 | 1:30pm-4:00pm | R. Effiong |
| | 11 | 84298 | LAB | TR | SQU 428 | 4:30am-7:00pm | R. Effiong |

Lab sections 2 – 7 are the ONLY labs associated with the TR 1:30 pm lecture section and

Lab sections 9 – 11 are the ONLY labs associated with the TR 9:00 am lecture section.

You can not attend a lab section that is not associated with your lecture section, so if you are in the 1:30 lecture section you must attend a lab in room 426 and if you are in the 9:00 lecture section you must attend a lab in room 428. There can be no "crossovers", not even for lab make-ups.

Prerequisite: CHEM 1A with a passing grade of C (not C-) or better. **Note: This prerequisite for CHEM 1B is strictly enforced. If you are enrolled or on the electronic waitlist, we have your transcripts on file.** If you are not enrolled and you are not on the electronic waitlist and looking to “crash” the course, you will be required to provide a copy of your transcript showing your grade in CHEM 1A to your laboratory instructor during the first or second day of lab.

Textbook: *Chemistry: A Molecular Approach by Tro* (4th Edition). If you had Dr. Mack **last semester** for Chem 1A, this is the same text.

Lab Manual: Chemistry 1B, General Chemistry: Laboratory Manual Fall 2018 (bookstore). **You must have the Fall 2018 version of the lab manual.**

Additional Supplies:

- Laboratory notebook (Composition book available at bookstore).
- Safety goggles, approved type with side and top protection.
- Scientific calculator.
- Laboratory coat and nitrile gloves (available at bookstore).
- MS Word and Excel (or equivalent)

Catalogue description: Continuation of the development of fundamental principles of chemistry and applications of principles developed in CHEM 1A. The laboratory work emphasizes applications of equilibrium principles including some qualitative analysis, coordination chemistry and electrochemistry. Lecture three hours, laboratory six hours. Knowledge of word processing and spreadsheet software is recommended. CHEM 001B meets a GE area B5 requirement, Further studies in Phys. Sci. (5 units).

General Education Area B-5 Learning Outcomes:

After a semester of Chemistry 1B, students will be able to:

- Make meaningful predictions regarding chemical reactions using observations and data collection
- Use scientific instruments to collect and graph empirical data
- Determine and find relationships in the data by interpreting data tables, graphs and equations
- Make critical observations and form conclusions based on the results of experimentation

Specific Learning Objectives: Students will be able to:

- Understand the nature and characteristics of chemical equilibria.
- Identify acids and bases and types of electrolytes, and write net ionic equations for acid-base reactions.
- Predict products of aqueous acid-base, single displacement and double displacement reactions and write net ionic equations.
- Apply the principles of chemical equilibria to aqueous solutions, including qualitative and quantitative problems involving acids and bases, salts, common-ions and buffers.
- Apply the principles of chemical equilibria to titration problems.
- Apply the principles of chemical equilibria to solutions of slightly soluble salts, including qualitative and quantitative problems.
- Understand the principles of thermodynamics, in particular entropy and free energy, know the three laws of thermodynamics and apply the concepts of entropy and free energy changes to characterizing reactions as spontaneous or at equilibrium.
- Balance oxidation-reduction reactions and identify reactants as oxidizing or reducing agents.
- Understand the principles of voltaic and electrolytic cells, diagram these cells and calculate cell potentials at standard and non-standard state conditions.
- Learn about aqueous systems in the environment and role of selected pollutants in the environment.
- Identify and characterize the chemical and physical properties of selected transition elements.
- Know the concepts of composition, structure and bonding in metal complex compounds.
- Apply concepts of crystal field theory and other bonding models to the magnetism and spectra of metal complex compounds
- Know the basic characteristics of hydrocarbons, name hydrocarbons and draw their structures.
- Know the basic characteristics of selected functional groups and how they are used in naming organic compounds.

Writing Component: Chemistry 1B fulfills an area B5 writing requirement through the use of written laboratory reports. Therefore, any written material submitted for grading will be evaluated for clarity, grammar, and spelling, in addition to its content. Appropriate points will be deducted for poorly written submissions.

Attendance:

Lecture: Attendance is not taken in lecture; however, lectures are meant to help you understand the reading material and introduce material associated with the lab. In class, you can expect that the instructor will discuss important concepts and work example calculations for challenging problems. It is to your benefit to attend lecture.

Lab: Attendance in lab is MANDATORY! You can not miss lab. You must complete each lab experiment and turn-in each laboratory write-up in order to pass the course. If for some unforeseen reason you miss a lab, you must have a verifiable excuse (i.e. doctor's note, note from work, police report, etc) and the lab experiment must be made up within one week. There will be no exceptions to this rule. If you do not have written documentation, you will not be able to make up the experiment and hence fail the course. If you have a verifiable excuse, you must attend a laboratory section other than your own and have the instructor's permission BEFORE making up the lab. The instructor of the lab in which you make up your lab MUST sign your data sheet. **Lab Reports are always due one week after finishing the lab experiment. Lab reports are not accepted late unless accompanied by a verifiable excuse such as a doctor's note. Unexcused late lab reports will be assigned a value of zero points. If any lab reports are missing it will result in an automatic "F" for the course.**

You should drop the course now if your work/personal schedule interferes with the exam and/or lab schedule.

Grading:

The grade scale to the right will be used. The majority of your grade is based on your performance on the exams, quizzes and final. Do not rely on the lab to pass this course.

- Refer to the Academic Regulations section of the *CSUS Catalog* for policies regarding CR/NC, I, and W grades.
- The instructor does reserve the right to adjust the grading scale downward but it will not be adjusted upward. Assume, however, there is no curve and the grading scale to the right will be used. Notice the C- cutoff is 69.0%.
- To check your points in the course, use SacCT.

| | |
|----|-------------|
| A | 92.0-100.0% |
| A- | 90.0-91.9% |
| B+ | 88.0-89.9% |
| B | 82.0-87.9% |
| B- | 80.0-81.9% |
| C+ | 78.0-79.9% |
| C | 72.0-77.9% |
| C- | 69.0-71.9% |
| D | 50.0-68.9% |
| F | < 50.0 % |

Lecture contribution

Three Midterm Exams (100 pts each) 300 pts
Final Exam (comprehensive) 200 pts

Laboratory contribution

Reports 205 pts
Unknowns 25 pts
Ten Quizzes (10pts each) 100 pts
Lab Midterm Exam 50 pts
Lab Final (last day of lab) 50 pts
Lab Notebook 15 pts

Total: **945 pts**

Regrade Requests: All re-grade requests **must be made in writing** (not email, but a formal written letter) within 1 week that the graded material (exams, lab reports, quizzes etc.) is returned. Your note must make clear why you think an error exists. Any requests beyond this point will be NOT be considered. Do not request lab reports to be regraded at the end of the semester. Your request will not be granted.

Exams (Three, 100pts each): Three exams will be given during class periods and must be finished during the time allotted. **Absolutely no makeup exams will be given** so please mark the dates on your calendar (see lecture schedule). If you are unable to take an exam AND have a documented excuse (i.e. police accident report or doctor's note), only then will a makeup exam will be given. **Absences from exams due to weddings, vacations, and other personal factors will result in the assignment of a zero for the missed exam.** All exams will be multiple choice, 25 questions. Bring Scantron, pencils and a calculator to the exams. You will NOT be allowed to use the calculator on your cell phone during the exams. If you are seen with your phone out during the exam, you will be asked to leave immediately and you will receive a zero on your exam.

Final Exam (200pts): Note that the final exam is multiple choice (50 questions) and comprehensive. All material discussed in Chem 1B will be weighted equally. All students must take the final in order to pass the course. Absolutely no make-up final exams will be given.

Homework: Problems and tutorials from the text will be assigned. Homework will not be collected or graded. Some of the exam questions will be similar to homework problems. *Be advised that the history of grades in Chem 1B shows a strong correlation between a student's performance on homework and working many additional problems to his/her final grade.*

Quizzes (10pts/each): Quizzes are given at the start of the laboratory period. Quizzes cover both lecture and laboratory topics. All 10 quizzes count toward your score and are worth 10pts each. No quizzes will be dropped. **No late or makeup quizzes are given for any reasons.**

Lab Midterm and Lab Final (50 pts each): During the eighth week of lab, we will administer a lab midterm and during the last day of lab, we will administer a lab final. The format of these exams will be multiple choice (25 questions, Scantron) and may include calculation or written-based questions. It is therefore in your best interest to make sure you know how to do all the pre-lab assignments and laboratory reports including all calculations.

Lab Notebook (15pts): You must purchase a hard cover lab notebook for Chem 1B. During the semester, lab books will be collected regularly and graded for completeness. All entries in the lab notebook must be made in ink at the time that an experiment is performed. Transcribing from loose-leaf pages at later times will not be tolerated. Never remove pages or completely black out data from your notebook. Make sure you follow the instructions in the Chem 1B lab manual on how to keep a laboratory notebook. If incomplete (no table of contents, you are missing a summary of an experiment , etc.) you will receive a zero.

Pre-laboratory assignments and Laboratory reports (220 + 25 unknown pts): Most of the experiments have pre-lab assignments that must be completed before coming to lab. Pre-lab assignments are due at the beginning of the lab period. If your pre-lab assignment is incomplete, you will not be allowed to perform the lab. **Laboratory reports are due at the beginning of the lab one week following the completion of the experiment. Lab reports will not be accepted late without a medical excuse. If you miss any lab report it will result in an automatic "F" grade for the course.**

Lab Safety: You will be given a safety presentation during the first week of lab. You will then sign a “contract” promising to abide by the safety rules of the laboratory. Failure to follow the safety rules will not be tolerated. If you fail to follow laboratory safety instructions you will not be permitted to return that day and if this occurs a second time you will be given an “F” grade for the semester and will not be permitted to return to the class.

Laboratory fees: A university lab fee is added to your registration fees and is paid at the cashier's office.

The laboratory period: The lab periods are 2 1/2 hours long. If you are prepared for the experiment there is no reason why you should not finish each experiment in its allotted time. Most labs have only a short period of time in between sections to be cleaned and prepared for the next class.

"Lecture-Only" status: A repeating student who has an **average of 86% or higher** on lab reports and lab exams may take the course as "Lecture-Only" one time. This means that that person will not have to attend lab. He/She will be enrolled in a lab but will come to lab only to take quizzes. The grade assigned this semester for that person's lab will be whatever percentage they had in lab the preceding semester. This can only be used one time, so a person who uses this option and fails the course cannot use this option again.

Classroom and Laboratory Etiquette: *Any student who disrupts the class will be asked to leave.*

- The use of cell phones, laptops and mp3 players in the classroom is strictly prohibited. If you have your cell phone out during an exam or quiz, you will be asked to leave and given a zero.
- No talking while the instructor is lecturing.
- Repeated tardiness that disrupts the class will not be tolerated.
- If you have to leave early, notify me, and slip out quietly.

*During the lab, your laboratory instructor will go over the background procedure and safety considerations for that day's lab. Therefore, it is essential that you arrive on time. **If you arrive more than 20min late for lab, you will not be allowed to perform the day's lab.***

Resources for help and time management: In addition to office hours held by your lecture and laboratory instructors, you are encouraged to use the Chemistry Department HELP office in Sequoia Room 502. The office hours for the help office will be posted on the door to SQU 502 during the second or third week of the semester. This course is time intensive because it requires learning sophisticated concepts, problem-solving and performing and writing up labs. It is suggested that you set aside a **minimum** of 15 hours per week for chemistry, 20 hours or more is recommended.

Students with disabilities: If you have a disability and require accommodations, you need to provide disability documentation to SSWD, Lassen Hall 1008, and (916)278-6955. Please discuss your accommodation needs with me after class or during my office hours early in the semester.

Cheating and plagiarism: Any cheating what so ever will be addressed with zero tolerance. All graded work (including quizzes, exams, homework, and lab reports) must be your own. Students found copying or assisting other students in copying any graded class assignments will be dealt with according to the University statement on Academic honesty (<http://www.csus.edu/admbus/umannual/UMA00150.htm>). A student tutorial on plagiarism is also available (<http://library.csus.edu/content2.asp?pageID=353>). In most cases, any type of plagiarism will result in the instructor assigning a **non-passing grade for the course.**

Dropping Chem 1B: *The student ultimately has the responsibility of dropping courses.*

- *Until the end of week 2:* Students may drop courses online using MySacState. Courses officially dropped during this time are not recorded on the student's transcript.
- *Until the end of week 6:* Dropping requires approval of the instructor and the department chair. Courses officially dropped during this time result in a grade of "W" and are allowed only for serious reasons.
- *After week 6:* Dropping requires approval of the instructor, department chair, and college dean. Drops during this period must be for medical or career-related reasons beyond the control of the student and must be verified in writing by a doctor or employer. Students who do not officially withdraw from the course by the prescribed deadlines and also fail to complete course requirements will receive an "F".
- Instructors have the authority to administratively remove any student who, during the first two weeks of instruction, fails to attend any two class meetings.

Lecture format:

We will discuss lecture topics and will be doing many example calculation problems. This is particularly true during the first two-thirds of the semester, where the emphasis of the course is placed on equilibrium constant calculations. You are expected to participate during class (ie example calculations) so please bring your calculator. See Lecture schedule for a list of topics.

The instructor reserves the right to change any part of this syllabus with notice to students during the course

CHEM 1B, Tentative Lecture Schedule, Fall 2018

| Week | Dates | Topic | Textbook Chapt |
|------|--------------------------------------|---|--------------------------|
| #1 | T, 8/28 R, 8/30 | Introduction to course and Chemical equilibrium \diamond^* Chemical equilibrium | 15.1-15.3 15.4-15.6 |
| #2 | T, 9/4 R, 9/6 | Chemical equilibrium LeChat's Principle and Acid-Base Equilibrium | 15.7-15.8 15.9 |
| #3 | T, 9/11 R, 9/13 | Acid-base Equilibrium * Acid-Base Equilibrium ** | 16.1-16.6 16.6-16.8 |
| #4 | T, 9/18 R, 9/20 | Polyprotic Acids, Lewis Acids and Bases Buffers | 16.9-16.11 17.1-17.3 |
| #5 | T, 9/25 R, 9/27 | Titration Exam #1 (Equil., Acids & Bases and Buffers) | 17.4 — |
| #6 | T, 10/2 R, 10/4 | Titration & Polyprotic Acid-Base Titrations Solubility and Precipitation | 17.4 cont'd 17.5-17.6 |
| #7 | T, 10/9 R, 10/11 | Solubility and Precipitation Thermodynamics *** | 17.7-17.8 18.1-18.4 |
| #8 | T, 10/16 R, 10/18 | Thermodynamics Thermodynamics | 18.5-18.7 18.8-18.10 |
| #9 | T, 10/23 R, 10/25 | Finish Thermo and Begin Electrochemistry **** Exam #2 (Titrations, Polyprotics, Solubility, Thermo) | 19.1 — |
| #10 | T, 10/30 R, 11/1 | Electrochemistry Electrochemistry | 19.1-19.4 19.5-19.7 |
| #11 | T, 11/6 R, 11/8 | Electrochemistry Finish Electrochemistry Review Electron Configs. | 19.8-19.9 8.3-8.7 |
| #12 | T, 11/13 R, 11/15 | Begin Transition Metals Transition elements | 25.1 - 25.3 25.4 |
| #13 | T, 11/20 R, 11/22 | Transition elements Thanksgiving Holiday | 25.5 - 25.6 |
| #14 | T, 11/27 R, 11/29 | Finish Transition elements & Intro to Organic Chem Exam #3 (Thermo, Electrochem, Metals) | 21.1-21.5 — |
| #15 | T, 12/4 R, 12/6 | Intro to Organic Chem Review/Discuss Final Exam | 21.6-21.8 |
| #16 | Finals: Sec. 1 Sec. 8 | Cumulative Final Exam: Thursday, Dec. 13, 12:45pm-2:45 pm Tuesday, Dec. 11, 10:15am-12:15am | |

\diamond^* **Everyone should study Chapter 4 and re-work odd numbered problems at the end of Chapter 4 before the first class.**

Before certain lectures students should review some Chem 1A materials:

* Review Chapter 3.6

** Review Chapter 4.4-4.8

*** Review Chapter 6.1-6.9

**** Review Chapter 4.9

CHEM1B, Laboratory Schedule, Fall 2018

| Week | Week of... | 1 st period (Mon/Tue) Quizzes | 1 st period (Mon/Tue) Lab Activity | 2 nd period (Wed/Thur) Lab Activity |
|------|----------------------|--|---|--|
| #1 | Aug 27 th | No quiz | Introductions and Safety Discussion | Dress for Lab with Safety Gear, locker check-in, Net Ionic Equation Discussion |
| #2 | Sep 3 rd | Quiz #1 Weds | Labor Day Holiday No Lab | Exp #1 Net Ionic Equations (Come with Prelab Tables completed) |
| #3 | Sep 10 th | Quiz #2 | Exp #1 Net Ionic Equations continued | Exp #15 Determination of K_f Prelab parts 2, 3, and 4; Not 1 |
| #4 | Sep 17 th | Quiz #3 | Exp #7 Qualitative analysis Anions (Exp #1 due) | Exp #7 continued (Exp #15 Due) |
| #5 | Sep 24 th | No Quiz | Optional Exam Review | Exp #7 continued/ Exp #2 Prep NaOH |
| #6 | Oct 1 st | Quiz #4 | Exp #2 Standardization of NaOH | Exp #5 Buffers (Exp #7 due) |
| #7 | Oct 8 th | Quiz #5 | Exp #5 Buffers continued (Exp #2 due) | Exp #3 Acid/Base Titrations |
| #8 | Oct 15 th | Quiz #6 | Exp #3 continued (Exp #5 due) | Exp #3 continued |
| #9 | Oct 22 nd | No Quiz | Optional Exam Review | Exp #4 Polyprotic Acids and Bases (Exp #3 due) |
| #10 | Oct 29 th | Quiz #7 | Exp #9 Enthalpy and Entropy | Lab Midterm Exam Covers experiments: 1, 2, 7, 5, 15. (Exp #4 due) |
| #11 | Nov 5 th | Quiz #8 | Exp #10 Electrochemistry (Exp #9 due) | Exp #10 Electrochemistry cont'd |
| #12 | Nov 13 th | Quiz #9 Weds | Veteran's Day Holiday No Lab | Exp #14 Coordination Complexes (Exp #10 due) |
| #13 | Nov 19 th | No quiz | Exp #14 continued | Thanksgiving No Lab |
| #14 | Nov 26 th | No quiz | Optional Exam Review (Exp #14 due in lab or instructor mailbox by end of lab) | Finish Experiments |
| #15 | Dec 3 rd | Quiz #10 | Clean up, Check out | Lab Final Covers experiments: 3, 4, 9, 10, 14. |

Report Point Values

| Experiment Number | Reports | Unknowns |
|-------------------|------------|-----------|
| 1 | 15 | |
| 2 | 15 | |
| 3 | 25 | 10 |
| 4 | 20 | |
| 5 | 20 | |
| 7 | 15 | 15 |
| 9 | 20 | |
| 10 | 35 | |
| 14 | 20 | |
| 15 | 20 | |
| TOTAL | 205 | 25 |

Remember: Lab reports are due one week after scheduled completion date at the beginning of the period. No late lab reports are accepted after the start of the laboratory period unless accompanied by medical or clinical counselor verification.

PRE-LABS: You will not be allowed to work in the laboratory if your prelab is not done before class. You will also not be allowed to make up the experiment, which you missed in another Laboratory Section. In other words, do your prelab before coming to the laboratory.

REPORTS: All lab reports are to be done on an individual basis unless instructed otherwise. Some lab activities are done in pairs but each person in the partnership must develop and write their lab report independently. Any copying of a partner's tables, writings, explanations is plagiarism and will result in at least a score of zero on the lab report and in some cases a failing grade in the entire course.

Reminder! There will be a LAB MIDTERM in the tenth week and a LAB FINAL at the end of the semester. Therefore, it is in your best interest to make sure you understand how to do ALL the prelab calculations and answer lab questions and calculations.