

Course Information

Semester & Year:	Spring 2023
Course ID & Section #:	CHEM-1A-E4604
Instructor's name:	Dr. David Duberow
Day/Time:	MW 11:40 am – 1:05 pm (<i>lecture, face-to-face or online</i>) TTh 10:00 am – 1:10 pm (<i>mandatory face-to-face lab</i>)
Location:	SC114 (Eureka Campus)
Number of proctored exams:	6
Number of units:	5.0

Instructor Contact Information

Office location:	SC216F
Office hours:	MW 10:00 – 11:30 am
Phone number:	707-476-4327
Email address:	David-Duberow@redwoods.edu

Required Materials

Textbook title:	<i>Chemistry and Chemical Reactivity</i> (required)
Edition:	5 th or later (6 th preferred)
Author:	Kotz, Treichel, and Weaver
ISBN-13:	978-0-534-99766-3
ISBN-10:	0-534-99766-X
Other materials:	Scientific or graphing calculator (required) Laboratory notebook (required) Safety goggles (required)

Catalog Description

The first semester of a one-year course in the principles of chemistry for students in science, engineering, medical and related professions. Atomic structure, chemical bonding, stoichiometry, the periodic table, enthalpy, solutions, and carbon chemistry will be studied. Includes a coordinated laboratory experience focused on the study of physical and chemical properties.

Course Student Learning Outcomes

1. Solve problems using the principles of chemistry.
2. Use the lab equipment correctly to get satisfactory results for the experiments performed.

Prerequisites

High school chemistry or CHEM 100: Preparation for General Chemistry
(or a score of 25 or higher on the California Diagnostic Test in Chemistry)
Intermediate Algebra

Course Overview

Chemistry 1A is the first of a two-semester series focused on the fundamental principles and theories of chemistry, with a particular emphasis on chemical calculations and scientific reasoning. It is intended to be a continued, in-depth study of the subject geared toward science, math, and engineering majors, and as such, a basic knowledge of chemistry is assumed.

General topics include classification of matter, measurements, atomic structure, bonding theory, nomenclature, chemical reactions, mole calculations, stoichiometry, solutions, acid/base chemistry, calorimetry, thermodynamics, quantum theory, periodicity, molecular structure, gas laws, kinetic-molecular theory, organic compounds.

Canvas Information

Course materials including lecture notes and videos, handouts, lab procedures, homework assignments and solutions, practice exams, announcements, and grades, will be posted on the course page on Canvas. Please monitor this site frequently to stay current on the material. Canvas can be accessed at <https://redwoods.instructure.com>. Your login ID is the same as your Webadvisor ID, and your initial password is your 8-digit birth date. For tech help, email its@redwoods.edu or call 707-476-4160. Canvas help for students is available online at <https://webapps.redwoods.edu/tutorial>. A Canvas orientation workshop can be accessed here: <https://redwoods.instructure.com/courses/6781>.

Homework

Homework problem sets are posted to Canvas on a regular basis and are *due at the beginning of class on the date specified on the assignment*. *Late homework will be assessed a 20% penalty for each day late*. If you are unable to attend class the day an assignment is due, you must make alternate arrangements to turn in your work by the start of class. Problem sets are graded out of 20 points and account for 10% of your overall grade in Chem 1A.

Proctored Exams

There will be four midterm exams given during the normal lab period. Exams will be directly related to the lecture material, homework problems, and lab work from the weeks preceding the exam. A cumulative final exam will be given during the officially designated period or at a time mutually agreed upon by the class. Make-up exams are permissible only for serious illness or family emergency and must be documented. All exams are proctored, in-person, closed-book, and must be completed individually without outside notes. Any instances of cheating will result in a zero for the assignment and disciplinary action by the college.

Evaluation & Grading Policy

Midterm 1 (Tuesday, Feb 14):	100 pts	10%
Midterm 2 (Thursday Mar 23):	100 pts	10%
Midterm 3 (Tuesday, Apr 18):	100 pts	10%
Midterm 4 (Thursday, May 4):	100 pts	10%
Final Exam (to be determined):	200 pts	20%
Homework	100 pts	10%
Lab	300 pts	30%
TOTAL	1000 pts	100%

Letter grades will be assigned based on the following scale:

A	92-100%	B+	88-89%	C+	78-79%	D	60-69%
A-	90-91%	B	82-87%	C	70-77%	F	0-59%
		B-	80-81%				

Class Schedule

The following is a rough timeline for the material I would like to cover, but it is subject to change based on the needs of the class. We will begin with a review of basic chemistry skills such as dimensional analysis, nomenclature, and stoichiometry—then revisit our understanding of atomic structure and bonding in the context of modern quantum theory. We will conclude with a discussion of kinetic theory and its applications in explaining the behavior of gases, as well as a preview of organic compounds and functional groups.

Date	Lecture	Text Reference (6th ed)
16-Jan	No class: Martin Luther King Jr Day	
18-Jan	Metric system, density	1.4, 1.6
23-Jan	Uncertainty, significant figures	1.7 - 1.8
25-Jan	Dimensional analysis, classifying matter	1.8, 1.1 - 1.5
30-Jan	Atomic structure, ions	2.1 - 2.4, 2.6 - 2.8
1-Feb	Ionic compounds, mole calculations	3.1 - 3.4, 2.5
6-Feb	Empirical formula	3.5 - 3.7
8-Feb	Chemical reactions	1.5, 4.1 - 4.2
13-Feb	Stoichiometry	4.3 - 4.6
15-Feb	Solutions	5.1, 5.8
20-Feb	No class: Presidents Day	
22-Feb	Acids and Bases	5.3
27-Feb	Metathesis reactions in aqueous solution	5.2, 5.4 - 5.6
1-Mar	Oxidation/reduction reactions	5.7, 5.10
6-Mar	Energy, constant pressure calorimetry	6.1 - 6.3
8-Mar	Bomb calorimetry	6.4 - 6.6
13-Mar	No class: Spring Break	
15-Mar	No class: Spring Break	
20-Mar	Hess's Law, enthalpies of formation	6.7 - 6.9
22-Mar	Properties of light, Bohr model of the atom	7.1 - 7.3
27-Mar	Quantum mechanics	7.4 - 7.7
29-Mar	Electron configurations	8.1 - 8.4
3-Apr	Periodic trends	8.5 - 8.7, 9.1, 9.4 - 9.6, 9.8 - 9.9
5-Apr	Bonding energies, classifying bond character	9.1 - 9.3, 9.10, 9.7
10-Apr	Valence bond theory	10.1 - 10.2
12-Apr	Molecular orbital theory	10.3
17-Apr	Molecular orbital theory	10.3
19-Apr	Gas Laws	12.1 - 12.4
24-Apr	Mixtures of gases, kinetic-molecular theory	12.5 - 12.9
26-Apr	Organic chemistry	11.1 - 11.2
1-May	Functional groups	11.3 - 11.5
3-May	Open lecture	

Tips

One of the goals of this class is to develop critical thinking skills in the context of scientific investigation. Whereas previous courses have introduced you to the fundamentals of chemistry, this course will require you to use these principles to evaluate scientific results and approach complex word problems. For this reason, active learning will be vital in this course. Think about the concepts as I introduce them in lecture and ask questions early if you don't understand something. Often, we will be working in groups to solve problems, so please bring a calculator to lecture and come prepared to participate. When you read the text, think through the examples and work the practice problems. These exercises force you to apply what you are reading and are the best way to track your understanding. Budget two hours of coursework outside of class for each hour spent in class and spread this time evenly over the entire week. Try to find a regular group of classmates with whom you can meet regularly and work together on problems and discussions. Finally, if you find yourself struggling at any point, please come to see me during office hours, stop me after class, or email me. Concepts in chemistry tend to build on each other, and so not correcting an early misunderstanding will only hurt you in the long run.

Laboratory

Chemistry is fundamentally an experimental science, and as such it is best learned when it is experienced hands-on. Laboratory work will be an essential part of this course and will include both group work and chemical experimentation. A handout for each experiment will be posted to Canvas prior to lab and will include all background, procedures, and follow up questions for each experiment.

A single bound notebook will be the primary record of your laboratory experience in Chem 1A. The lab notebook is intended to be an entirely self-sufficient document, containing enough information for a trained scientist to repeat your experiment and compare their results without referring to supplementary information. Your notebook must therefore contain detailed information on the procedure for each experiment, all data and observations, results and calculations, and overall conclusions. Laboratory notebooks will be collected five times during the semester and scored out of 30 possible points for completeness, accuracy of results, answers to follow-up questions, and overall quality of your records. Late notebooks will be assessed a 20% penalty for each day late.

The notebook must be hard-bound (three-ring binders are not acceptable, nor are spiral-bound notebooks or notebooks with perforated pages). Pages must be numbered sequentially.

All entries must be made in indelible ink (not pencil), with a ~~single line through any errors.~~

A title page should include the course title and section, semester and year, and your name.

The second page should contain a table of contents listing the name and first page of each experiment. The table of contents must be kept current throughout the semester.

The following sections must be included for each experiment:

A descriptive title for the experiment, as well as the date on which it was performed.

A brief but clearly stated purpose for the experiment (one to three sentences).

A detailed but succinct summary of the procedure, as it was followed in the lab. Note that it is not acceptable simply to reference the lab manual: instead, include sufficient detail for each step so that the experiment can be duplicated exactly. This section can be written before performing the experiment, but it should be modified as necessary to include deviations from the original procedure.

Any data and/or observations collected during the experiment. This section should include any measurements made, along with appropriate units and significant figures. Numerical data should be tabulated if possible. Qualitative observations should also be noted here.

Any calculations performed on the data. One example must be shown for each type of calculation performed. Multiple trials of the same type need not be shown individually; however the results should be given in a table.

A thorough discussion of the results of the experiment. Any overall numerical results should be restated explicitly, followed by a careful analysis of error. Avoid broad statements like “human error” or “calculation error” and state specific steps in the procedure in which error could have been introduced, as well as potential ways in which the experiment could be improved. If a true value is known, percent error should be reported and discussed here.

Because our time in lab is limited, it is essential that you arrive prepared, having read the experiment thoroughly. You will be far more capable of making good observations and processing information efficiently if you are familiar with the procedure. More importantly, you will be far less likely to endanger yourself and/or your labmates if you are aware of what you are doing. *Be sure to check the laboratory schedule below regularly to ensure you are prepared for the correct experiment:*

Date	Lab
17-Jan	Lab Safety
19-Jan	Experiment 1: Measurements
24-Jan	Experiment 2: Density
26-Jan	Open lab
31-Jan	Experiment 3: Mass Spectrometry
2-Feb	Experiment 4: Avogadro's Number
7-Feb	Experiment 5: Empirical formula
9-Feb	Experiment 6: Formulas of Hydrates
14-Feb	Midterm 1
16-Feb	Experiment 7: Analysis of a Sulfate
21-Feb	Experiment 7: Analysis of a Sulfate
23-Feb	Experiment 8: Qualitative Analysis
28-Feb	Experiment 9: Vinegar Titration
2-Mar	<i>Lab lecture: Solution stoichiometry</i>
7-Mar	Experiment 10: Microtitration of Vitamin C
9-Mar	Experiment 11: Calorimetry
14-Mar	No lab
16-Mar	No lab
21-Mar	Open lab
23-Mar	Midterm 2
28-Mar	Experiment 12: Atomic Spectroscopy
30-Mar	Experiment 13: Ionization Energy and Electron Configurations
4-Apr	Experiment 14: Lewis Structures
6-Apr	Experiment 14: Molecular Geometry
11-Apr	Open lab
13-Apr	Lab Exam
18-Apr	Midterm 3
20-Apr	Experiment 15: Galvanized Nail
25-Apr	Experiment 16: Synthesis of Aspirin
27-Apr	Experiment 16: Synthesis of Aspirin
2-May	Experiment 16: Synthesis of Aspirin
4-May	Midterm 4

Proper lab attire must be worn at all times. Safety goggles are required for each experiment, even if particularly hazardous chemicals are not being used. *All students must wear safety glasses in the lab room whenever any group is conducting an experiment.* Long pants and closed-toed shoes are encouraged. It is strongly recommend that contact lenses not be worn in the lab, as they can trap chemicals and interfere with the eyewash in the event of an emergency. Students dressed inappropriately for lab may be asked to leave.

Regular lab attendance is mandatory throughout the semester, except in cases of *dire, documented emergency*. **If you miss lab during the first two weeks of the semester, you will be dropped from CHEM 1A.** Although you are welcome to work on calculations and follow-up questions at home, your data and observations must be complete before leaving lab.

Most importantly, all students are expected to conduct themselves in compliance with posted safety regulations at all times. You will have the opportunity to work with dangerous chemicals over the course of the term. Treat these chemicals with respect.

The laboratory component of CHEM 1A is worth 300 points, or 30% of your overall grade. Of these, 150 are awarded based on periodic lab notebook checks throughout the semester. In addition, one formal written lab report will be required during the semester. This report will be worth 50 points, and the details will be announced during lab. The remaining 100 points will be based on a proctored lab exam given during the regular lab period on **Thursday, Apr 13th**. The lab exam will be based on experimental procedures and calculations performed in the weeks prior to the exam, and lab notebooks may be used during the exam.

Finally, “discretionary points” may be deducted from any experiment score for flagrant instances of poor lab etiquette. Specific behaviors warranting deductions include, but are not limited to, arriving to lab late or inappropriately dressed, rushing through experiments, spilling reagents, being uncooperative with your labmates, and leaving before your group has finished an experiment.

Admissions Deadlines and Enrollment Policies

Spring 2023 Dates:

Classes begin:	Jan 14
Martin Luther King Jr Day (all campuses closed):	Jan 16
Last day to add a course:	Jan 20
Last day to drop course without a “W” and with refund:	Jan 27
Census Day:	Jan 30
Lincoln’s Birthday (all campuses closed):	Feb 17
Presidents Day (all campuses closed):	Feb 20
Last day to petition to graduate or apply for certificate:	Mar 2
Spring break (no classes):	Mar 13-18
Last day for student- or faculty-initiated withdrawal (no refund):	Mar 31
Final exams:	May 6-12
Semester ends:	May 12
Commencement	May 15
Grades available for transcript release (approx):	May 26

Students who have experienced extenuating circumstances can complete & submit the ***Excused Withdrawal Petition*** to request an Excused Withdrawal (EW) grade instead of the current Withdrawal (W) or non-passing (D, F & NP) grades. The EW Petition is available from the Admissions and Records Forms Webpage. Supporting documentation is required.

Accessibility

College of the Redwoods is committed to making reasonable accommodations for qualified students with disabilities. If you have a disability or believe you might benefit from disability-related services and accommodations, please contact your instructor or [Disability Services and Programs for Students](#) (DSPS). Students may make requests for alternative media by contacting DSPS at 707-476-4280, or on the first floor of the Student Services Building.

If you are taking online classes, DSPS will email approved accommodations for distance education classes to your instructor. In the case of face-to-face instruction, please present your written accommodation request to your instructor at least one week before the needed accommodation so that necessary arrangements can be made. Last-minute arrangements or post-test adjustments cannot usually be accommodated.

Academic Dishonesty

In the academic community, the high value placed on truth implies a corresponding intolerance of scholastic dishonesty. In cases involving academic dishonesty, determination of the grade and of the student’s status in the course is left primarily to the discretion of the faculty member. In such cases where the instructor determines that a student has demonstrated academic dishonesty, the student may receive a failing grade for the assignment and/or exam and may be reported to the Chief Student Services Officer or designee. The Student Code of Conduct ([AP 5500](#)) is available on the College of the Redwoods website. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [College Catalog](#) and on the [College of the Redwoods website](#).

Disruptive Behavior

Student behavior or speech that disrupts the instructional setting will not be tolerated. Disruptive conduct may include, but is not limited to: unwarranted interruptions; failure to adhere to instructor's directions; vulgar or obscene language; slurs or other forms of intimidation; and physically or verbally abusive behavior. In such cases where the instructor determines that a student has disrupted the educational process, a disruptive student may be temporarily removed from class. In addition, the student may be reported to the Chief Student Services Officer or designee. The Student Code of Conduct ([AP 5500](#)) is available on the College of the Redwoods website. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [College Catalog](#) and on the [College of the Redwoods website](#).

Inclusive Language in the Classroom

College of the Redwoods aspires to create a learning environment in which all people feel comfortable in contributing their perspectives to classroom discussions. It therefore encourages instructors and students to use language that is inclusive and respectful.

Setting Your Preferred Name in Canvas

Students have the ability to have an alternate first name and pronouns to appear in Canvas. Contact [Admissions & Records](#) to request a change to your preferred first name and pronoun. Your preferred name will only be listed in Canvas. It does not change your legal name in our records. See the [Student Information Update form](#).

Emergency Procedures/Everbridge

College of the Redwoods has implemented an emergency alert system called Everbridge. In the event of an emergency on campus you will receive an alert through your personal email and/or phones. Registration is not necessary in order to receive emergency alerts. Check to make sure your contact information is up-to-date by logging into WebAdvisor <https://webadvisor.redwoods.edu> and selecting 'Students' then 'Academic Profile' then 'Current Information Update.'

Please contact Public Safety at 707-476-4112 or security@redwoods.edu if you have any questions. For more information see the [Redwoods Public Safety Page](#).

In an emergency that requires an evacuation of the building anywhere in the District:

- Be aware of all marked exits from your area and building
- Once outside, move to the nearest evacuation point outside your building (please review the [campus emergency map](#) for evacuation sites)
- Keep streets and walkways clear for emergency vehicles and personnel
- Do not leave campus unless it has been deemed safe by the campus authorities.

Community College Student Health and Wellness

Resources, tools, and trainings regarding health, mental health, wellness, basic needs and more designed for California community college students, faculty and staff are available on the California Community Colleges [Health & Wellness website](#).

[Wellness Central](#) is a free online health and wellness resource that is available 24/7 in your space at your pace.

Students seeking to request a counseling appointment for academic advising or general counseling can email counseling@redwoods.edu.

Student Support Services

The following online resources are available to support your success as a student:

- [CR-Online](#) (Comprehensive information for online students)
- [Library Articles & Databases](#)
- [Canvas help and tutorials](#)
- [Online Student Handbook](#)

[Counseling and Advising](#) offers academic support that includes academic advising and educational planning

Learning Resource Center includes the following resources for students:

- [Academic Support Center](#) for instructional support, tutoring, learning resources, and proctored exams.
- [Library Services](#) to promote information literacy and provide organized information resources.
- [Multicultural & Diversity Center](#)

Special programs are also available for eligible students include:

- [Extended Opportunity Programs & Services \(EOPS\)](#) provides services to eligible income disadvantaged students. These services include textbook award, career academic and personal counseling, school supplies, transportation assistance, tutoring, laptop, calculator and textbook loans, priority registration, cap and gown, workshops, and more.
- The TRiO Student Success Program provides eligible students with a variety of services including trips to 4-year universities, career assessments, and peer mentoring. Students can apply for the program in [Eureka](#) or in [Del Norte](#)
- The [Veteran's Resource Center](#) supports and facilitates academic success for active-duty military, veterans and dependents attending CR through relational advising, mentorship, transitional assistance, and coordination of military and veteran-specific resources.