

# PRINCIPLES OF CHEMISTRY I

CHEM 1210

Fall 2023

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<b>Instructor:</b>	Matthew Rowley	<b>Office Hours:</b>	MWRF 10:00 am – 11:00 am
<b>Telephone:</b>	(435) 586-7875		T 1:00 pm – 2:00 pm
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Please include the course number in the subject line of all correspondence.

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## Course Description

This is an introductory chemistry course designed for students in engineering, physical science, pre-medical, pre-dental, pre-pharmacy, or pre-veterinary medicine. It is for all students who need more than one year of chemistry, and presents the foundational principles on which all other chemistry courses build.

**General Education:** This course is required for beginning Chemistry majors requiring more than one year of chemistry. It can also be taken by other students to fulfill the General Education (GE) requirements for “Knowledge Area:Physical Science (P).” The principles of chemistry underlie much of modern society. Students will explore the basic principles of chemistry, allowing them to better understand the world around them at a basic level. This will prepare students to be informed citizens of the modern world in topics such as medicine, materials, energy and pollution.

**Prerequisites:** A proficient understanding of algebra will be required for this course. Either MATH 1050 (College Algebra), or a background of algebra from high school will suffice.

**Concurrent requisite:** CHEM 1215 – Principles of Chemistry Lab I

### Required Course Materials:

Access to *Achieve* online homework and Interactive General Chemistry digital textbook (details below)

### Recommended Supplementary Materials:

*Preparing for Your ACS Examination in General Chemistry: The Official Guide* Sold in our department office to fund Chem Club activities

### Student Learning Outcomes:

**Knowledge of the Physical and Natural World** Students will recall, interpret, compare, explain, and apply chemistry terminology and theory

**Quantitative Literacy** Students will use chemical equations, graphs, and tables to interpret and communicate chemical information.

**Inquiry and Analysis** Students will solve complex chemical problems.

**Critical Thinking** Students will make decisions based on conceptualizing, applying, and analyzing information from different sources.

## Tentative Schedule

This class will meet on Mondays, Tuesdays, Wednesdays, and Fridays from 3:00 – 3:50 in room 228 of the Science Center (SC).

For the best lecture experience, read the indicated textbook chapter *before* each lecture.

	Date	Topic	Chapter
Week 1	W, Aug. 30	Classification and Properties of Matter and Energy	1.1-1.3
	F, Sep. 1	The Scientific Method	1.4
Week 2	M, Sep. 4	<b>Labor Day - No Class!</b>	
	T, Sep. 5	Units and Significant Digits	1.5-1.6
	W, Sep. 6	Dimensional Analysis, Density, and Temperature	1.7-1.9
	F, Sep. 8	Chemical Symbols and Chemical Combination	2.1-2.2
Week 3	M, Sep. 11	The History of the Atom and Atomic Structure	2.3-2.4
	T, Sep. 12	Atomic Masses and the Periodic Table	2.5-2.6
	W, Sep. 13	Formulas and Names – Binary Covalent Compounds	3.1-3.2
	F, Sep. 15	Formulas and Names – Ionic Compounds	3.3-3.4
Week 4	M, Sep. 18	Naming Acids and Nomenclature Review	3.5-3.6
	T, Sep. 19	The Mole and Molar Mass	3.7-3.8
	W, Sep. 20	Percent Composition and Empirical Formulas	3.9-3.10
	F, Sep. 22	Molecular Formulas and Combustion Analysis	3.11-3.12

	Date	Topic	Chapter
Week 5	M, Sep. 25	Chemical Equations and Reactions	4.1-4.2
	T, Sep. 26	Compounds in Aqueous Solution and Precipitation Reactions	4.3-4.4
	W, Sep. 27	Acid-Base Reactions	4.5
	F, Sep. 29	Oxidation States and Redox Reactions	4.6-4.7
Week 6	M, Oct. 2	Calculations for Chemical Reactions	5.1-5.2
	T, Oct. 3	Limiting Quantities and Yields	5.3-5.4
	W, Oct. 4	Definition and Uses of Molarity	5.5-5.6
	F, Oct. 6	Calculations Involving Other Quantities	5.7
Week 7	M, Oct. 9	Calculations with Net Ionic Equations	5.8
	T, Oct. 10	Titration	5.9
	W, Oct. 11	Energy, Heat, and Work	6.1-6.3
	F, Oct. 13	Enthalpy and Specific Heat	6.4-6.5
Week 8	M, Oct. 16	<b>Fall Break - No Class!</b>	
	T, Oct. 17	<b>Fall Break - No Class!</b>	
	W, Oct. 18	Calorimetry: Measuring Energy Changes	6.6
	F, Oct. 20	Enthalpy in Chemical Reactions	6.7
Week 9	M, Oct. 23	Standard Enthalpies of Formation	6.8
	T, Oct. 24	Gas Pressure and Simple Gas Laws	7.1-7.3
	W, Oct. 25	The Combined Gas Law and the Ideal Gas Law	7.4-7.6
	F, Oct. 27	Partial Pressures, Molar Mass, and Density of gases	7.7-7.8
Week 10	M, Oct. 30	Gas Reactions and the Kinetic Molecular Theory	7.9-7.10
	T, Oct. 31	Movement of Gas Particles	7.11
	W, Nov. 1	Behavior of Real Gases	7.12
	F, Nov. 3	Light and the Bohr Model of the Atom	8.1-8.2

	Date	Topic	Chapter
Week 11	M, Nov. 6	Electron Shells, Subshells, and Orbitals	8.3
	T, Nov. 7	Energy-Level Diagrams and Electron Configurations	8.4-8.5
	W, Nov. 8	Quantum Numbers	8.6
	F, Nov. 10	Valence Electrons and Atomic/Ionic Sizes	9.1-9.2
Week 12	M, Nov. 13	Ionization Energy and Electron Affinity	9.3
	T, Nov. 14	Ionic Bonding and Lattice Energy	9.4-9.5
	W, Nov. 15	Formation of Covalent Bonds	10.1
	F, Nov. 17	Lewis Structures	10.2
Week 13	M, Nov. 20	<b>Thanksgiving Break - No Class!</b>	
	T, Nov. 21	<b>Thanksgiving Break - No Class!</b>	
	W, Nov. 22	<b>Thanksgiving Break - No Class!</b>	
	F, Nov. 24	<b>Thanksgiving Break - No Class!</b>	
Week 14	M, Nov. 27	Resonance and Formal Charges	10.3
	T, Nov. 28	Exceptions to the Octet Rule	10.4
	W, Nov. 29	Polar Bonds and Bond Enthalpy	10.5-10.6
	F, Dec. 1	VSEPR and Molecular Geometry	11.1
Week 15	M, Dec. 4	Polar and Nonpolar Molecules	11.2
	T, Dec. 5	Valence Bond Theory	11.3
	W, Dec. 6	Using Valence Bond Theory	11.4
	F, Dec. 8	Molecular Orbital Theory	11.5
Finals Week	T, Dec. 12	<b>Final Exam 3:00–4:50 pm: Bring a pencil and scantron</b>	

## Course Requirements

Grades will be based on the following items:

**Chapter Homework** 15%

**Adaptive Homework** 15%

**Quizzes** 10%

**4 Midterm Exams** 40%

**Final Exam** 20%

Final Grades will be assigned according to the following scale:

Percentage	Grade		Percentage	Grade
93.0-100	A		73.0-77.0	C
90.0-93.0	A-		70.0-73.0	C-
87.0-90.0	B+		67.0-70.0	D+
83.0-87.0	B		63.0-67.0	D
80.0-83.0	B-		60.0-63.0	D-
77.0-80.0	C+		< 60.0	F

**Midterm Exams:** There are four midterm exams, to be completed in class on the designated day unless prior arrangements have been made. It is departmental policy that exams not be returned, although students can examine the questions in my office after they have been graded.

**Final Exam:** The final exam is comprehensive. The final is produced by the American Chemical Society, and the instructor will not have access to the exam prior to its administration. Therefore, it is to your advantage to learn as much as possible throughout the semester. The test is multiple choice and a 100-question scantron will be required.

**Quizzes:** Quizzes will be given at the beginning of most days. The purpose of these quizzes is to provide practice for the exams (since I am the author of both quizzes and exams) and to encourage punctual attendance.

**Adaptive Homework:** Achieve adaptive homework assignments ("Learning Curve" assignments) draw adaptively from a large pool of generally short questions. Students must correctly answer a certain number of questions from each topic before the assignment is completed. If a question is missed, a similar one will be presented some time later until the questions are answered correctly. Students who are missing questions should pay attention to the cues for further study and consider taking a break to return to the assignment later.

**Chapter Homework:** The Achieve online homework assignments are organized by chapter and are of substantial length. I recommend completing the assignments in multiple sessions (Achieve saves your work), as we cover new material each day. You can find a link to sign up for Achieve in our Canvas course.

**Attendance Policy:** Students are expected to attend class. If you must miss class, contact the instructor

**Late Work Policy:** Homework and take-home quizzes will be due on a day when class is regularly scheduled. All work is to be turned in at the *beginning* of the class period, and late work will not be accepted. Please note that online homework has due-dates at 11:55 pm, and will not be available after that time

**Make-up Work Policy:** In general, there will be no opportunity to make up missed work, including in-class quizzes. If you must miss class, please do any assigned work in advance, and arrange to turn it in early

## Miscellany

**Scientific Calculator:** There are many different ways to calculate figures during homework. It is tempting to rely on Online resources such as <http://www.wolframalpha.com>, or to simply use a calculator application on a smart phone. During exams, however, any devices capable of connecting to the Internet will *not* be allowed. You will instead need a scientific calculator capable of performing exponentiation and logarithms for the exams. Using this calculator exclusively while doing homework will ensure that you are familiar with it for use during exams.

### **Important syllabus statements related to ATTENDANCE and COVID-19:**

*What should I expect in the classroom this semester?*

The following are general guidelines for the classroom environment

**Class Attendance is Required:** If you are registered for a Face-to-Face, Synchronous Remote, or Hybrid course, attendance is required. If you are ill or instructed to isolate or quarantine, you may request a faculty member record the class and share it with you or you may request other reasonable accommodations. Your instructor will work with you to develop a plan for completing coursework while you are isolated/quarantined. In order for you to receive academic accommodations and ensure that your request is communicated to faculty, you must submit this [self report form](#).

**Course delivery modalities** are posted online for each course, but may be modified in response to emerging COVID conditions: SUU is employing every effort to maintain a learning environment that is engaging and safe. The course modality listed when you registered for courses should remain for the semester; however, due to COVID conditions, the delivery of modality for a specific course may change during the semester. Normally, these changes will be short term (possibly the length of a quarantine or isolation time period), or in some cases longer. When such a modification is needed, faculty members will work with their department chair and/or dean and the students to maintain an effective learning environment.

**Academic Integrity:** Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent (see [SUU Policy 6.33](#)). You are expected to have read and understood the current SUU student conduct code ([SUU Policy 11.2](#)) regarding student responsibilities and rights, the intellectual property policy ([SUU Policy 5.52](#)), information about procedures, and what constitutes acceptable behavior.

Please Note: The use of websites or services that sell or generate essays (including Artificial Intelligence) is a violation of these policies; likewise, the use of websites or services that provide answers to assignments, quizzes, or tests is also a violation of these policies.

**ADA Statement:** Students with medical, psychological, learning, or other disabilities desiring academic adjustments, accommodations, or auxiliary aids will need to contact the [Disability Resource Center](#), located in Room 206F of the Sharwan Smith Center or by phone at (435) 865-8042. The Disability Resource Center determines eligibility for and authorizes the provision of services.

If your instructor requires attendance, you may need to seek an ADA accommodation to request an exception to this attendance policy. Please contact the Disability Resource Center to determine what, if any, ADA accommodations are reasonable and appropriate.

**Emergency Management Statement:** In case of emergency, the university's Emergency Notification System (ENS) will be activated. Students are encouraged to maintain updated contact information using the link on the homepage of the *mySUU* portal. In addition, students are encouraged to familiarize themselves with the Emergency Response Protocols posted in each classroom. Detailed information about the university's emergency management plan can be found at: <http://www.suu.edu/emergency>

**Academic Credit:** According to the federal definition of a Carnegie credit hour: A credit hour of work is the equivalent of approximately 60 minutes of class time or independent study work. A minimum of 45 hours of work by each student is required for each unit of credit. Credit is earned only when course requirements are met. One (1) credit hour is equivalent to 15 contact hours of lecture, discussion, testing, evaluation, or seminar, as well as 30 hours of student homework. An equivalent amount of work is expected for laboratory work, internships, practica, studio, and other academic work leading to the awarding of credit hours. Credit granted for individual courses, labs, or studio classes range from 0.5 to 15 credit hours per semester.

**Non-Discrimination Statement:** SUU is committed to fostering an inclusive community of lifelong learners and believes our university's encompassing of different views, beliefs, and identities makes us stronger, more innovative, and better prepared for the global society.

SUU does not discriminate on the basis of race, religion, color, national origin, citizenship, sex (including sex discrimination and sexual harassment), sexual orientation, gender identity, age, ancestry, disability status, pregnancy, pregnancy-related conditions, genetic information, military status, veteran status, or other bases protected by applicable law in employment, treatment, admission, access to educational programs and activities, or other University benefits or services.

SUU strives to cultivate a campus environment that encourages freedom of expression from diverse viewpoints. We encourage all to dialogue within a spirit of respect, civility, and decency. For additional information on non-discrimination, please see [Policy 5.27](#) and/or visit: <https://www.suu.edu/nondiscrimination>.

**HEOA Compliance Statement:** For a full set of Higher Education Opportunity Act (HEOA) compliance statements, please visit <https://www.suu.edu/heoa>. The sharing of copyrighted material through peer-to-peer (P2P) file sharing, except as provided under U.S. copyright law, is prohibited by law; additional information can be found at <https://my.suu.edu/help/article/1096/heoa-compliance-plan>. You are also expected to comply with policies regarding intellectual property ([SUU Policy 5.52](#)) and copyright ([SUU Policy 5.54](#)).

**SUUSA Statement:** As a student at SUU, you have representation from the SUU Student Association (SUUSA) which advocates for student interests and helps work as a liaison between the students and the university administration. You can submit MySUU Voice feedback by going to <https://www.suu.edu/suusa/voice>. Likewise, you can learn more about SUUSA's Executive Council at <https://www.suu.edu/suusa/executive-council> and about all of SUUSA's Student Senators at <https://www.suu.edu/suusa/senate>. If you have any specific concerns regarding any of your courses, please contact the SUUSA VP of Academics at: [suusa\\_academicsvp@suu.edu](mailto:suusa_academicsvp@suu.edu).

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**Thriving Thunderbirds:** If you find yourself struggling with mental health issues, please visit <https://www.suu.edu/mentalhealth> for access to valuable resources.

Mental health is essential for your academic success. SUU provides resources, support, and services to address mental health issues at every level of concern. We are committed to helping all **Thunderbirds Thrive**.

If you need assistance navigating any of the resources, please contact [Counseling and Psychological Services](#), the [Dean of Students' Office](#), or the [Health and Wellness Center](#).



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