

CHEN 1211: Accelerated General Chemistry for Engineers
Fall 2025, MWF 8:30AM-9:20AM; JSCBB A108

- Instructor: Prof. Andrew Goodwin, JSCBB D318, andrew.goodwin@colorado.edu
Office Hours: W 9:30AM-11:00AM, JSCBB E1B11
- Teaching Assistants: Yahaya Muhammad yahaya.muhammad@colorado.edu
Recitation: M 1:25-2:15pm CASE E230 and T 12:30-1:20pm DUAN G2B41.
Office Hours: T 1:45-2:45pm, JSCBB C319
Sergio Morales sergio.morales@colorado.edu Office Hours: W 2:30-3:30pm JSCBB E225
Cassidy Ward Cassidy.ward@colorado.edu Office Hours: M 3-4 pm, JSCBB C319
- We will hold extra office hours around exam times.
→ All office hours and recitations will begin Week 3 (9/11/23+).
- Textbook (Required): Nivaldo J. Tro, *Chemistry: A Molecular Approach*, 6th Edition. You should be able to access the textbook through Canvas, Accessing Pearson (in the left menu). Mastering Chemistry is not required.
- Optional Resources: **Free** supplemental resources: [LibreTexts](#), [Wikipedia](#), [LearnChemE Screencasts](#).
- Prerequisites: AP Chemistry and/or Placement Exam into Class
High School Algebra/Pre-Calc and Physics (Not Calculus)
- Communication: Announcements, homework assignments, quizzes, and other communication will be run through Canvas at canvas.colorado.edu. Please feel free to email your instructor or TA **but be sure to include "CHEN 1211" at the beginning of your subject line** so we can find it! If you would like guidance on how to write emails, please see [this](#). We may also set up a Discord server for discussions, TBA.
- Grading: Class attendance/clickers: 5% (3 drops allowed)
Recitation attendance/participation: 5% (1 drop allowed)
Homework: 20% (1 drop allowed)
Midterms: 3 x 15% = 45%
Final exam: 25% = 25%
→ Note that since exams count for most of your grade, you must be sure that you are learning the material sufficiently! Do not simply rely on your classmates (or other resources) for help!
- Class Attendance: Class attendance is mandatory and will be enforced by iClicker. You are allowed 3 absences, no questions asked.
- Homework: Due **Wednesday at 11:59pm**. Homework must be submitted via Gradescope in PDF format as scanned or photographed from a handwritten page. You may work together, but you must submit separate work! Late penalty: 10 points per hour late up to 50 points; no work accepted after 24 hours late.
- Exams: See schedule. All midterms will be held in class, and the final exam will be held at the date/time scheduled by the university. You must work separately on the exams, only using allowed resources. Details TBA near the time of each exam.
- Learning Outcomes: By the end of this course, you will be able to:
1. Perform introductory mass and mole balance equations.
2. Relate electron position to atomic and molecular energy, and vice versa.

3. Understand the different types of chemical bonding, their properties, and relative strength.
4. Hypothesize bulk molecular properties from molecular structure.
5. Understand how interatomic movement of electrons give rise to chemical reactivity and equilibria.
6. Relate molecular and state properties to thermodynamics and kinetics of processes.

ABET Outcomes:

This class directly addresses the following ABET student outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
3. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

CHEN 1211, Fall 2024: Approximate Class Schedule.

<u>Date</u>	<u>Topic</u>	<u>Reading (Tro)</u>
8/22	Welcome! Introductory topics, dimensions and units, precision	Ch 1
8/25	Modern Atomic Theory, subatomic particles	Ch 2.1-2.6
8/27	Introduction to the Periodic Table, moles	Ch 2.7-2.9
8/29	Wave-particle duality	Ch 8.1-8.4
9/1	<i>LABOR DAY, NO CLASS</i>	
9/3	Quantum numbers	Ch 8.4-8.6
9/5	Orbitals and their shapes	Ch 8.4-8.6
9/8	Electronic configurations, Aufbau, Pauli exclusion principle	Ch 9.1-9.3
9/10	Periodic Table trends, Ionization energy, electron affinity	Ch 9.4-9.6, Ch 9.7-9.9
9/12	Chemical reactions, atomic and mole balance	Ch 4.1-4.3
9/15	Yield, limiting reagent, excess reagent	Ch 4.4-4.5
9/17	<i>MIDTERM 1 (roughly)</i>	
9/19	Energy and enthalpy	Ch 7.1-7.4
9/22	Energy and enthalpy	Ch 7.5-7.9
9/24	Reaction enthalpy	Ch 7.5-7.9
9/26	Chemical bonding: ions and ionic bonds	Ch 3.1-3.10 (skip organic)
9/29	Covalent bond: Lewis model	Ch 10.2-10.5
10/1	Covalent bond: Lewis model	Ch 10.6-10.9
10/3	Properties of chemical bonds	Ch 10.10-10.11
10/6	VSEPR theory and molecular shape	Ch 11.2-11.5
10/8	Valence bond theory	Ch 11.6-11.7
10/10	Valence bond theory, molecular orbital theory	Ch 11.6-11.8
10/13	Molecular orbital theory	Ch 11.6-11.8
10/15	REVIEW	
10/17	<i>MIDTERM 2</i>	
10/20	States of matter: gases and kinetic molecular theory	Ch 6.2-6.3, 6.8-6.9
10/22	Ideal gas law and other equations of state	Ch 6.4-6.6, 6.10

10/24	Liquids and intermolecular forces	Ch 12.1-12.4
10/27	Phase transitions and phase diagrams	Ch 12.5-12.6
10/29	Phase transitions and phase diagrams	Ch 12.7-12.8
10/31	Properties of solutions	Ch 14.1-14.5
11/3	Chemical equilibria	Ch 16
11/5	Chemical equilibria	Ch 16
11/7	Acids and bases	Ch 17.1-17.7
11/10	Acids and bases	Ch 17.8-17.11
11/12	REVIEW	
11/14	<i>MIDTERM 3 (roughly)</i>	
11/17	Entropy and free energy	Ch 19.1-19.5
11/19	Entropy and free energy	Ch 19.6-19.10
11/21	Electrochemistry	Ch 20.1-20.8
11/24-28	<i>FALL BREAK</i>	
12/1	Electrochemistry	Ch 20.1-20.8
12/3	Chemical kinetics	Ch 15.1-15.7
12/5	Chemical kinetics	Ch 15.1-15.7
	REVIEW, TBA	
	FINAL EXAM, TBA	

Class Policies:

This Syllabus mostly rearticulates CU Boulder Required Syllabus Statements online:

<https://www.colorado.edu/academicaaffairs/policies-customs-guidelines/required-syllabus-statements>

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the [classroom behavior](#) policy, the [Student Code of Conduct](#), and the [Office of Institutional Equity and Compliance](#).

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

Religious Holidays and Observances

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please let an instructor know **as soon as possible** of an upcoming obligation, **minimum one week prior**. See the [campus policy regarding religious observances](#) for full details.

Temporary Medical Conditions, Including Isolation for Covid-19

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the [Public Health Office](mailto:contacttracing@colorado.edu) (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the [Public Health Office](mailto:contacttracing@colorado.edu) (contacttracing@colorado.edu).

To alert your professor of an illness-related (including COVID-19) absence, please email your professor as soon as possible with the subject line "CHEN 1211: illness". **You do not have to disclose your specific illness or injury.** We will work with you in terms of deadlines and absences.

Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact [Counseling and Psychiatric Services \(CAPS\)](#) located in C4C or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through [Academic Live Care](#). The [Academic Live Care](#) site also provides information about additional wellness services on campus that are available to students.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information does not always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. You may also let your instructor know of your preference by email. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code academic integrity policy. Violations of the Honor Code may include, but are not limited to: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Old course materials from past years are unauthorized. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu; 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the [Honor Code website](#).

All lectures and course materials, including class notes, tests, homeworks, and similar materials, are protected by copyright. The instructor and the University of Colorado are the exclusive owners of copyright in those materials. You may take notes and make copies of course materials for your own use. You may not and may not allow others to reproduce or distribute lecture notes and course materials publicly, whether or not a fee is charged, without express written consent from the course instructor.

The following are examples of dishonest acts (not comprehensive!) for which a hearing may result:

1. Talking to each other during an exam time, inside or outside the exam room.
2. Possessing or searching for any unallowed information during an exam.
3. Alteration, forgery, or falsification of official records (such as modification of graded homework problems or exams for which you are seeking additional credit, including regrades).
4. Allowing another person to take an exam or submit homework for you (false identification).
5. Knowingly providing material of your own or of others to a fellow student.
6. Possession or observation of exams or exam materials prior to the date and time of the exam.

7. Allowing another person to answer clicker questions for you, or answering clicker questions for someone else.
8. Attempting to bribe, threaten, or otherwise influence an instructor or TA, or having another person attempt to do this for you.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. The university will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking protected-class discrimination and harassment, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email cureport@colorado.edu. Information about university policies, [reporting options](#), and support resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit [Don't Ignore It](#).