



CHEM 1420.002 **General Chemistry II for Science Majors** **SPRING 2026**

INSTRUCTOR

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CLASS TIMES AND LOCATION

Lecture: Monday, Wednesday, Friday 9:00 AM – 9:50 AM, Room: Wh 222
Recitation: Monday 12:00 PM – 12:50 PM, Room: BLB 080

OFFICE HOURS

Monday, Wednesday 10:15 – 11:45 AM, or by appointment (SRB 246)
Office hours give you the chance to ask for clarification and get help with understanding class material. I strongly encourage you to take advantage of this opportunity. Your success is my priority!

COMMUNICATION

Email is the best way to reach me (Daniel.Afosah@unt.edu). I typically respond to emails within 48 hours on Weekdays. If your question requires a detailed discussion, please come to my office during scheduled office hours. All out-of-class announcements will be shared via Canvas. Be sure to set up your Canvas page so that you receive push notifications of changes made to the page

COURSE DESCRIPTION

This course is designed for science and science-related majors and is a continuation of Chemistry 1410 (General Chemistry I). The course is calculation-intensive, and students will spend much of their time performing quantitative problem-solving. A scientific calculator is required. Students are expected to recall and apply foundational concepts from General Chemistry I. Prior review of topics such as chemical nomenclature, formulas of common compounds, Lewis structures, solubility rules, balancing chemical equations, mole calculations, and limiting reactants will be beneficial. Course topics include colligative properties of solutions, chemical thermodynamics, chemical equilibrium, modern acid–base theory, buffers, solubility, electrochemistry, reaction kinetics, and nuclear chemistry.

COURSE PREREQUISITES OR OTHER RESTRICTIONS

Pre-reqs:

Grade of “C” or better in CHEM 1410 (General Chemistry I) or equivalent.

Co-Req:

While enrollment in CHEM 1440 (General Chemistry II Laboratory) is not required, it is strongly encouraged. Students who are not required to take the laboratory or are unable to do so this semester will not be disadvantaged. CHEM 1440 is a separate course from CHEM 1420, and students receive separate grades for each; dropping one course does not automatically drop the other. Students enrolled in the laboratory should ensure they are registered for both the lab lecture section (CHEM 1440.00x) and the laboratory section (CHEM 1440.4xx)

COURSE OBJECTIVES

At the completion of the course, students should be able to:

- Demonstrate an understanding of the colligative properties of solutions and their mathematical expression.
- Demonstrate an understanding of the nature of acids and bases, both "weak" and "strong".
- Use the concepts of thermodynamics to predict the spontaneity of processes, as well as the changes in free energy, entropy, and enthalpy.
- Demonstrate an understanding of the concept of chemical equilibria and its application to gas phase equilibria, heterogeneous equilibria, acid-base equilibria, and solubility; show the relationship between free energy and equilibrium constant
- Demonstrate an understanding of the basic concepts of electrochemistry and be able to use standard reduction potentials to calculate quantities involved in an electrochemical reaction; relate free energy, equilibrium constant, and cell potential
- Demonstrate an understanding of chemical kinetics and the relationship to reaction mechanisms and be able to perform calculations related to the rates of chemical reactions.
- Write nuclear symbols for nuclides and subatomic particles and explain the differences between nuclear and chemical reactions
- Describe nuclear fusion and fission, balance nuclear reactions and use kinetics of radioactivity to solve problems.

COURSE MATERIALS

Electronic Textbook: Chemistry, Atoms First, 2nd Edition.

Link to textbook: <https://openstax.org/details/books/chemistry-atoms-first-2e>

If you bought a textbook, I encourage you to return it for a refund! You only need the e-book above.

Calculator: TI-30 series, or any equivalent Scientific Calculator

Bring your calculator to every class, quiz, and exam. Practice using your calculator!

Homework, Assignments, Quizzes, and Examinations: All homework, assignments, and exams will be accessed through Canvas. Quizzes and recitation questions will be administered on iClicker or paper during class or recitation sessions. Any changes to these formats will be communicated to students in advance through Canvas announcements and, when possible, during class.

OTHER RESOURCES

Chemistry Resource Center (CRC): CHEM 231 – on- Thurs. 8am-6pm, Fri 8am-3pm –staffed by Chemistry graduate students. For more information visit: <https://chemistry.unt.edu/undergraduate-program/instructional-resources>.

The Computational Chemistry Instructional Laboratory (CCIL): CCIL provides computer access to all undergraduate and graduate students enrolled in UNT chemistry courses. Computers are to be used only for chemistry related work and instruction. The CCIL is staffed by chemistry graduate students knowledgeable in the area of computational chemistry. More information about CRC and CCIL can be found at this website (<https://chemistry.unt.edu/undergraduate-program/instructional-resources>).

Undergraduate Teaching Assistants (PLTL) - One or two 90-minute meetings per week. –These are small study groups working collaboratively on challenging course content problems, guided by a peer leader.

Graduate Teaching assistants (TA) (See PLTL/TA resources in Canvas for contact emails)

CLASS POLICIES

Announcements

All out-of-class announcements will be by email or via Canvas, and you are expected to check these on a regular basis.

Attendance Policy

Class attendance will be taken and there will be group activities that will be turned in for a grade during every lecture. Research has shown that students who attend class are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF) (<https://policy.unt.edu/policy/06-039>). It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Your safety and well-being are important to me, so if you cannot attend a class due to an emergency, please let me know. If you will miss several classes for any reason (e.g., sickness, travel, interview or athletics) make me aware of this.

Classroom Conduct

Students are expected to maintain a respectful learning environment that supports both their classmates' ability to learn and the instructor's ability to teach. Disruptive behavior will not be tolerated.

Classes will begin and end at the times listed in the syllabus. If you arrive late or need to leave early, please sit near the door to minimize disruption. All cell phones and electronic devices must be silenced during class. Laptops, tablets, and phones may be used only for activities directly related to the course. The use of social media, texting, internet browsing, videos, phone conversations, sleeping, or side conversations during class is prohibited.

Headphones or earbuds (including AirPods, wired, or Bluetooth) are not permitted in lecture or recitation unless approved as an accommodation. Students requiring accommodations should work with the Office of Disability Access (<https://studentaffairs.unt.edu/office-disability-access>) and notify the instructor once documentation is in place.

Students who engage in disruptive behavior may be asked to leave class immediately and may be suspended for up to one week for a first offense, with longer suspensions for repeated violations. Recording or photographing the instructor or course materials without explicit permission is prohibited. The Code of Student Conduct is available at [Dean of Students | University of North Texas](#).

Assessment

Your grade will be determined by quizzes, take-home assignments, participation in lectures and recitations, in-term examinations, and a final examination. Details are provided below.

- Quizzes – 100 points total (10% of overall grade), Lowest 3-4 will scores will be dropped.
- Weekly Assignments/Homework – 200 points total (20% of overall grade), Lowest 2-3 scores will be dropped
- Lecture Participation – You will earn points for participating in the group quizzes given in lecture.
- Recitation Assignments – There will be a paper recitation worksheets and quizzes during recitations for a total of 150 points; 15 % of overall grade.
- 4 In-Term Examinations – 100 points each (lowest score dropped) 300 points total (30 % of overall grade).
- 1 Cumulative Final Exam – 150 points (15 % of overall grade)

I.	Quizzes	150
II.	Assignments (Take-Home)	200
III.	Recitation Assignments and Quizzes	150
IV.	Lecture participation	50
V.	In-Term Examinations (4 X 100)	300 (lowest dropped)
VI.	Final Examination	150
	Total Points	1000

Grading Scale

A = 900-1000

B = 800-899

C = 700-799

D = 600-699

F = <599

Examinations

There will be four **60-minute exams**, each consisting of **20–25 multiple-choice questions worth 100** points, administered on **Fridays** during the semester. The lowest of the four exam grades will be dropped; however, a zero earned due to academic dishonesty may not be dropped. All exams are closed-book and closed-notes and must be taken on the scheduled dates listed in the course schedule.

All regular semester exams will be administered in the Testing Center, where students may drop in during the designated testing windows. Once an exam has begun, students must remain in the testing room for the duration of the exam and may not leave and return. Students are required to bring a writing utensil (preferably a pencil with a good eraser) and a scientific calculator; scratch paper will be provided. Personal electronic devices, including cell phones, tablets, laptops, and headphones/earbuds/AirPods, are not permitted. Use of any prohibited device during an exam will result in a score of zero for that exam. Makeup exams will be permitted only in cases of university-excused absences or well-documented serious illness requiring hospitalization, as verified through the Office of the Dean of Students, when applicable. Students must notify the instructor as soon as possible if they anticipate missing an exam. The instructor reserves the right to determine the validity of all excuses. A missed exam without an approved excused absence will receive a grade of zero, which will serve as the dropped exam and may be replaced by the final exam score if the final exam grade is higher. Makeup exams will not be offered for unexcused absences.

For foreseeable conflicts, including religious observances, scheduled medical procedures, medical appointments, or work-related travel, students are required to notify the instructor at the beginning of the semester or as soon as the conflict becomes known. Requests submitted on the day of, or after, a missed exam for foreseeable conflicts will not be approved.

Final Exam (15%)

The final exam is a **120-minute cumulative exam** covering all course content and will be administered on the scheduled date listed above. Students must complete the exam within the designated testing window, with no exceptions. The exam will be held in the Testing Center, and students may drop in during the testing window, as with regular semester exams. Additional details will be provided during the semester.

Late work

Late submission of homework, quizzes, and other assigned coursework will not be accepted after the posted deadlines except in cases of university-excused absences or extremely extenuating circumstances, as determined by the instructor. Students must notify the instructor as soon as possible if circumstances arise that may affect their ability to meet a deadline. The instructor reserves the right to

determine the validity of all requests for late submissions. Under rare and extenuating circumstances, extensions or alternative arrangements may be granted at the instructor's discretion.

Limited accommodations may be provided in accordance with guidance from the Office of the Dean of Students for matters typically handled by that office, including religious observances and serious personal or family circumstances. For foreseeable absences, such as religious holidays, scheduled medical procedures, medical appointments, or work-related travel, students are required to notify the instructor at the beginning of the semester or as soon as the conflict becomes known. Requests made on the day of, or after, a missed deadline for foreseeable absences will not be granted.

Extra Credit

Students will earn 2 extra credit points for each 90-minute Peer-Led Team Learning (PLTL) session attended, up to a maximum of two sessions per week and 20 total extra credit points for the semester. Attendance will be recorded by the PLTL program; however, students are responsible for maintaining their own attendance records. Please note that the instructor will not have access to attendance totals until the end of the semester, so students should not inquire about the number of sessions attended during the semester.

Incomplete Grades

An Incomplete (I) grade will be assigned only in accordance with university policy and only during the final one-fourth of the semester. To be eligible for an Incomplete, a student must: (1) be passing the course at the time the Incomplete is requested; (2) have a justifiable reason why required coursework cannot be completed on schedule; and (3) make arrangements with the instructor to complete the remaining work at a later date by fulfilling specific requirements documented by the instructor on the electronic grade roster. An Incomplete grade may not be used to replace a failing grade. All remaining coursework must be completed within the timeframe specified by the university, not to exceed one year from the end of the semester in which the course was taken. Additional information is available through the Office of the Registrar at <https://registrar.unt.edu/grades/incompletes>.

Technology Requirements

This course includes digital components. To fully participate, students must have access to a laptop computer and reliable internet to engage with course content, assessments, and in-class activities delivered through the Canvas Learning Management System. The course will also utilize iClicker for in-class participation and engagement. Students must have access to speakers and a microphone, required plug-ins, and the Microsoft Office Suite, and must meet Canvas technical requirements as outlined at: <https://clear.unt.edu/supported-technologies/canvas/requirements>. Instructions for accessing any additional required software will be provided, and students will be notified of any changes to technical requirements. Guidance on succeeding in a digital learning environment is available through Learn Anywhere at: <https://online.unt.edu/learn>.

iClicker

Engagement, participation, and interaction in class are essential components of the learning process and will count toward your final grade. This course will use **iClicker**; therefore, each student must be registered and have a compatible device (computer, smartphone, or tablet) available for polling during class.

You may participate using:

- The **iClicker Student App** (iOS/Android)
- The **iClicker Website** (iclicker.com)
- An **iClicker Device**

When setting up your account, select **University of North Texas** as your institution and enter your **EUID** (Canvas login ID) in the *Student ID* field. Add this course to your list; it will appear each time you log in. Join the session at the start of class—connecting to UNT Wi-Fi is recommended.

Your iClicker participation counts toward your engagement grade. If you miss class, you miss that day's points; no make-ups will be given except in approved circumstances.

iClicker is to be used only for your own participation while present in class. Submitting responses for another student, having someone respond for you, or answering when absent is considered academic dishonesty and will be treated accordingly.

Academic Integrity

According to UNT Policy 06.003, Student Academic Integrity, academic misconduct means the intentional or unintentional action by a student to engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, sabotage, and use of AI tools to complete assignments. A finding of academic misconduct may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Disability Accommodation

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (<https://studentaffairs.unt.edu/office-disability-access>). You may also contact ODA by phone at (940) 565-4323.

Academic Success Resources

UNT strives to offer a high-quality education in a supportive environment where you can learn, grow, and thrive. As a faculty member, I am committed to supporting you, and I want to remind you that UNT offers a range of mental health and wellness services to help maintain balance and well-being. Utilizing these resources is a proactive way to support your academic and personal success. To explore campus resources designed to support you, check out [mental health services \(https://clear.unt.edu/student-support-services-policies\)](https://clear.unt.edu/student-support-services-policies), visit unt.edu/success, and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrappysays.unt.edu. A list of other support services available to students is provided below.

- Student Health and Wellness Center (<https://studentaffairs.unt.edu/student-health-and-wellness-center>)
- Counseling and Testing Services (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- UNT Care Team (<https://studentaffairs.unt.edu/care>)
- UNT Psychiatric Services (<https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry>)
- Individual Counseling (<https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling>)
- Registrar (<https://registrar.unt.edu/registration>)
- Financial Aid (<https://financialaid.unt.edu/>)
- Student Legal Services (<https://studentaffairs.unt.edu/student-legal-services>)
- Career Center (<https://studentaffairs.unt.edu/career-center>)
- Multicultural Center (<https://edo.unt.edu/multicultural-center>)

- Counseling and Testing Services (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- Pride Alliance (<https://edo.unt.edu/pridealliance>)
- UNT Food Pantry (<https://deanofstudents.unt.edu/resources/food-pantry>)
- Academic Resource Center (<https://clear.unt.edu/canvas/student-resources>)
- Academic Success Center (<https://success.unt.edu/asc>)
- UNT Libraries (<https://library.unt.edu/>)
- Writing Lab (<http://writingcenter.unt.edu/>)
- MathLab (<https://math.unt.edu/mathlab>)
- Chemistry Resource Center (CRC) (<https://chemistry.unt.edu/undergraduate-program/instructional-resources>)

Inclusion

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. We will discuss our classroom's habits of engagement and I also encourage you to review UNT's student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (<https://policy.unt.edu/policy/07-012>).

Eagle Alert and Calendar Change

If UNT closes due to weather or emergency, you will be notified through Eagle Alert. The course schedule may be subject to change.

Course Evaluation

Student Perceptions of Teaching (SPOT) is UNT's official course evaluation system and gives students the opportunity to confidentially provide constructive feedback to their instructor and department. Student feedback plays an important role in improving teaching effectiveness, course design, and the overall learning experience, and students are strongly encouraged to participate.

HOW TO SUCCEED IN THIS COURSE

Success in this course depends on consistent engagement and active participation. Because immunology is cumulative, each topic builds upon concepts introduced earlier, missing even one lecture can make later material more challenging to grasp. To give yourself the best chance of success:

- Attend every class and recitation
- Review lecture slides before class and take detailed notes during the lecture.
- Ask questions during class or email me if something is unclear.
- Complete all assignments on time.
- Use office hours
- Attend PLTL sessions
- Study regularly
- Form study groups

SYLLABUS CHANGE POLICY

If any aspect of this course changes, an updated syllabus will be posted on Canvas. In addition, a Canvas announcement will be made and, when possible, the change will also be communicated verbally during class.

TENTATIVE SCHEDULE (Subject to change)

Week	Date	Material	Assignments
1	M, Jan 12 W, Jan 14 F, Jan 16	Introduction. Syllabus. ALEKS. Good study habits. Begin Chapter 10 Chapter 10: Liquids and solids Chapter 10	Chap 10 quiz 1 Chap 10 quiz 2

2	M, Jan 19 W, Jan 21 F, Jan 23	MLK Day Holiday – No Classes Chapter 10 Chapter 11 Physical Properties of Solutions	Chap 10 HW Chap 11 quiz 1
3	M, Jan 26 W, Jan 28 F, Jan 30	Chapter 11 Chapter 11 Chapter 11	Chap 11 quiz 2 Chap. 11 quiz 3 Chap 11 HW
4	M, Feb 2 W, Feb 4 F, Feb 6	Chapter 12: Entropy and Gibbs Energy Chapter 12, Exam 1 Review Exam 1: Chap 10 & 11, drop in 9:00am–9:00pm in SAGE 332	Chap 12 quiz 1 Chap 12 HW1
5	M, Feb 9 W, Feb 11 F, Feb 13	Chapter 12 Chapter 13: Fundamentals of Equilibrium Chapter 13	Chap 12 quiz 2 Chap 13 quiz 1 Chap 12 & 13 HW
6	M, Feb 16 W, Feb 18 F, Feb 20	Chapter 13 Chapter 13 Chapter 13	Chap 13 quiz 2 Chap 13 HW 2 Chap 13 quiz 3
7	M, Feb 23 W, Feb 25 F, Feb 27	Chapter 13 Chapter 13 Chapter 14	Chap 14 quiz 1 Chap 14 quiz 2 Chap 14 HW 1
8	M, Mar 2 W, Mar 4 F, Mar 6	Chapter 14 Chapter 14, Exam 2 Review Exam 2: Chap 12 & 13, drop in 9:00am–9:00pm in SAGE 332	Chap 14 quiz 3 Chap 14 HW
9	M, Mar 9 W, Mar 11 F, Mar 13	Spring Break – No Classes	
10	M, Mar 16 W, Mar 18 F, Mar 20	Chapter 14 Chapter 15: Equilibria of Other Reactions Chapter 15	Chap 14 quiz 4 Chap 15 quiz 1 Chap 15 HW 1
11	M, Mar 23 W, Mar 25 F, Mar 27	Chapter 15 Chapter 15: Chapter 15:	Chap 15 quiz 2 Chap 15 HW Chap 15 quiz 1
12	M, Mar 30 W, Apr 1 F, Apr 3	Chapter 16: Electrochemistry Chapter 16, Exam 3 Review Exam 3: Chap 14 & 15, drop in 9:00am–9:00pm in SAGE 332	Chap 16 quiz 1 Chap 16 HW 2
13	M, Apr 6 W, Apr 8 F, Apr 10	Chapter 16 Chapter 17, Chemical Kinetics Chapter 17	Chap 16 quiz 2 Chap 17 quiz 1 Chap 17 HW 1
14	M, Apr 13 W, Apr 15 F, Apr 17	Chapter 17 Chapter 17 Chapter 17	Chap 17 quiz 2 Chap 17 HW 2 Chap 17 quiz 3
15	M, Apr 20 W, Apr 22 F, Apr 24	Chapter 17 Chapter 20, Exam 4 Review Exam 4: Chap 16 & 17, drop in 9:00am–9:00pm in SAGE 332	Chap 17 quiz 3 Chap 20 HW 1 1
16	M, Apr 27 W, Apr 29 F, May 1	Chapter 20, Final Exam Review Final Exam Review UNT Reading Day – No Classes	Chap 20 quiz 2
17	W, May 6	Comprehensive Final Exam: drop in 9:00am–9:00pm in SAGE 332	

Honor Code: “I commit myself to honor, integrity, and responsibility as a student representing the University of North Texas community. I understand and pledge to uphold academic integrity as set forth by UNT Student Academic Integrity Policy, 06.003 (<https://policy.unt.edu/policy/06-003>). I affirm that the work I submit will always be my own, and the support I provide and receive will always be honorable.”

Name:

Signature:

Date:

The descriptions and timelines outlined in this document are subject to change.