

Physical Chemistry (CHEM 5200, Graduate Proficiency) – 2026 Fall

Instructor	Linxiao Chen (Linxiao.Chen@unt.edu ; Office: <u>Chemistry 378</u>)
Lectures	<u>11:10 AM – 12:30 PM M/W, Chemistry 352</u>
Student Hours	<u>10 – 11 AM Tuesday</u> , by appointment, or the “green-sign” policy
Pre-requisite	General Chemistry I – II, Two Semesters of Calculus (or equivalent) Undergraduate Physical Chemistry (UNT 3510/3520, good to have)
Textbook	<u><i>Physical Chemistry</i>, 10th edition, by Peter Atkins, Julio de Paula, 2010</u> (recommended, NOT required; any edition would work) <i>Electronic copies of 10th and 8th edition available online</i> <i>Physical copy of 11th edition available at UNT Bookstore</i>
Learning Outcomes At-a-Glance	1. Understand the three laws of thermodynamics 2. Describe and solve problems related to basic physical chemical processes using thermodynamic principles 3. Analyze kinetic data to extract reaction rates and mechanisms; depict a molecular/atomic view of chemical reactions 4. Understand the basic concepts of quantum mechanics and how they are applied to derive physical and chemical principles. <i>Enhance analytical, logical, communication skills; HAVE FUN!!!</i>
Grades	<u>In-Class Quiz</u> – 5 pts (0.5 pts * 10) <u>Homework (<i>Top 6 out of 7</i>)</u> – 24 pts (4 pt each) <u>Unit Exams (<i>Top 3 out of 4</i>)</u> – 45 pts (15 pts each, <i>open-PAPER</i>) <u>Final Paper</u> – 16 pts <u>Learn-Share-Teach</u> – 10 pts <u>Extra credit</u> – 8 pts (2 pts * 4 assignments) <u>Scale (%)</u> : A : > 90.00; B : 80.00 – 89.99; C : 70.00 – 79.99; D : 60.00 – 69.99; F : < 60
Policies At-a-Glance	• <u>Homework</u>: posted on Canvas, usually due in a week (three-day extension upon request); discussions welcomed but no plagiarism • <u>Attendance</u>: notification prior to absence; honor system • <u>Communication</u>: course materials, notifications, and notes posted through Canvas or email • <u>AI Tools</u>: good helper, but use with CAUTION (do NOT trust AI blindly; AI writing is NOT that good! NO AI during the exams) and properly acknowledge the use
Tips	• Do <i>UNDERSTAND</i>, don't memorize • Do <i>PRACTICE</i>, don't take it for granted • Do <i>ASK WHYS</i>, don't only know hows • Do <i>COMMUNICATE and PARTICIPATE</i>, don't be a stranger

Schedule Outline

Week	Date	Lecture #	Topic	Chapter (10 th ed)
1	8/17	1	Introduction + Review + Properties of Gases	1
	8/19	2	Properties of Gases	1
2	8/24	3	First Law of Thermodynamics	2
	8/26	4		
3	8/31	5	Second Law of Thermodynamics	3
	9/2	6		
4	9/7	Labor Day		
	9/9	7	Second Law of Thermodynamics + Review	3
5	9/14	Unit Exam #1: Thermodynamics – Basics		
	9/16	8	Physical Transformation of Pure Substances	4
6	9/21	9		
	9/23	10	Simple Mixtures	5
7	9/28	11	Simple Mixtures + Chemical Equilibrium	5 – 6
	9/30	12	Chemical Equilibrium + Review	6
8	10/5	Unit Exam #2: Thermodynamics – Applications		
	10/7	13	Kinetics	20
9	10/12	14		
	10/14	15		
10	10/19	16	Molecular Reaction Dynamics	21
	10/21	17	Molecular Reaction Dynamics + Review	21
11	10/26	Unit Exam #3: Reaction Kinetics and Molecular Dynamics		
	10/28	18	Introduction to Quantum Mechanics + Quantum Description of Motion	7 – 8
12	11/2	19		
	11/4	20		
13	11/9	21	Atomic Structure	9
	11/11	22	Atomic Structure + Review	9
14	11/16	Unit Exam #4: Introduction to Quantum Chemistry		
	11/18	Selected Topic: Learn-Share-Teach		
15	11/23	Thanksgiving		
	11/25			
16	11/30	Selected Topic: Learn-Share-Teach		
	12/2	Selected Topic: Learn-Share-Teach		
12/9		Final Paper Due		

Course Policies

Assignment and Exam

Late submission of assignments is allowed upon request with reasonable causes.

Practice Exams will be posted on Canvas.

The exact number of homework assignments and allowed drops may vary in the case of weather events.

All exams are given in the paper form. Any forms of paper notes and/or books are allowed, but devices beyond a memory-cleared calculator (no TI-Inspire) are not permitted.

The system of automatic drops is designed to provide maximum flexibility: one (1) homework assignment and one (1) unit exam are dropped. If a student misses an exam due to military service, birth of a child, hospitalization, or UNT event (athletics, band) they must send documentation to the professor within one week to find a makeup solution. If a student misses the final exam due to a UNT-approved absence and is passing, they receive an Incomplete (I) until they can complete a make-up version of the final exam.

Exam Dates: September 14 (Monday, Unit #1), October 5 (Monday, Unit #2), October 26 (Monday, Unit #3), November 16 (Monday, Unit #4)

Students missing one exam will have that score dropped; students missing two exams will have their final exam % replace their second missed exam.

Final paper is mandatory.

Final Paper Due: December 9 (Tuesday)

Class Participation

Course Conduct: I am committed to creating a learning environment where diverse perspectives are recognized and valued as a source of strength. I request that all students work with me to create a WELCOMING class culture based on open communication, mutual respect, and inclusion. As a class we will approach all discussions with respect and civility. Disagreements and debates in academic discourse are expected and welcome, but personal attacks are never OK, and will not be tolerated. I strive to ensure an open and welcoming classroom for all students. If I ever miss the mark, please don't hesitate to come and talk to me. We are all learning together.

If you need more guidance, please do not hesitate to ask! We do not have TA for graduate level courses, but this campus also provides extensive academic supports for students,

and these supports are there to let students achieve the academic success they are truly capable of. Below is a list of the academic support offices offered by UNT.

Chemistry Resource Center (CRC) – Free tutoring in Chemistry room 231; staffed by graduate students in chemistry

Student Drop-In Hours- Professor (listed above, posted on Canvas under Announcements, and announced periodically in class)

The Learning Center- provides academic coaching, free personal tutors, classes on speed reading, note taking and other skills

Syllabus Change

If a syllabus change is required, it will be posted as an announcement on Canvas.

Course Evaluation

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

UNT Policies

Academic Integrity Policy

Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. This includes using electronic communication with other people during exams, formula sheets or notes used on exams, etc.

In my experience, academic misconduct most often occurs because students become overwhelmed and desperate. If you are concerned about how you are doing in this course, please come speak with me instead of considering academic misconduct. You are very capable of meeting my expectations for this course.

ADA Policy

Accommodations exist to provide opportunities for all students to succeed and I am happy to work with students. Several students have undiagnosed disabilities that have manifested during our course and have affected their success. Niels Bohr, Nobel laureate in chemistry, experienced undiagnosed dysgraphia (yes, I diagnosed him)! Accommodations are NOT unfair advantages or unrealistic supports that don't exist in the "real world" – these supports are mandated by law so that all people have the tools they need to succeed.

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of 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 accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the [ODA website](https://disability.unt.edu/) (<https://disability.unt.edu/>).

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Retention of Student Records

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Canvas online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about student's records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University's policy. See UNT Policy 10.10, Records Management and Retention for additional information.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be

directed to leave the virtual classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's [Code of Student Conduct](https://deanofstudents.unt.edu/conduct) (<https://deanofstudents.unt.edu/conduct>) to learn more.

Access to Information - Eagle Connect

Students' access point for business and academic services at UNT is located at: my.unt.edu. All official communication from the University will be delivered to a student's Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail [Eagle Connect](https://it.unt.edu/eagleconnect) (<https://it.unt.edu/eagleconnect>).

Student Evaluation Administration Dates

Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the [SPOT website](http://spot.unt.edu/) (<http://spot.unt.edu/>) or email spot@unt.edu.

Sexual Assault Prevention

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.

Important Notice for F-1 Students taking Distance Education Courses

Federal Regulation

To read detailed Immigration and Customs Enforcement regulations for F-1 students taking online courses, please go to the [Electronic Code of Federal Regulations website \(http://www.ecfr.gov/\)](http://www.ecfr.gov/). The specific portion concerning distance education courses is located at Title 8 CFR 214.2 Paragraph (f)(6)(i)(G).

The paragraph reads:

(G) For F-1 students enrolled in classes for credit or classroom hours, no more than the equivalent of one class or three credits per session, term, semester, trimester, or quarter may be counted toward the full course of study requirement if the class is taken on-line or through distance education and does not require the student's physical attendance for classes, examination or other purposes integral to completion of the class. An on-line or distance education course is a course that is offered principally through the use of television, audio, or computer transmission including open broadcast, closed circuit, cable, microwave, or satellite, audio conferencing, or computer conferencing. If the F-1 student's course of study is in a language study program, no on-line or distance education classes may be considered to count toward a student's full course of study requirement.

University of North Texas Compliance

To comply with immigration regulations, an F-1 visa holder within the United States may need to engage in an on-campus experiential component for this course. This component (which must be approved in advance by the instructor) can include activities such as taking an on-campus exam, participating in an on-campus lecture or lab activity, or other on-campus experience integral to the completion of this course.

If such an on-campus activity is required, it is the student's responsibility to do the following:

- (1) Submit a written request to the instructor for an on-campus experiential component within one week of the start of the course.
- (2) Ensure that the activity on campus takes place and the instructor documents it in writing with a notice sent to the International Student and Scholar Services Office. ISSS has a form available that you may use for this purpose.

Because the decision may have serious immigration consequences, if an F-1 student is unsure about his or her need to participate in an on-campus experiential component for this course, s/he should contact the UNT International Student and Scholar Services

Office (telephone 940-565-2195 or email internationaladvising@unt.edu) to get clarification before the one-week deadline.

Student Verification

UNT takes measures to protect the integrity of educational credentials awarded to students enrolled in distance education courses by verifying student identity, protecting student privacy, and notifying students of any special meeting times/locations or additional charges associated with student identity verification in distance education courses.

See [UNT Policy 07-002 Student Identity Verification, Privacy, and Notification and Distance Education Courses](https://policy.unt.edu/policy/07-002) (<https://policy.unt.edu/policy/07-002>).

Use of Student Work

A student owns the copyright for all work (e.g. software, photographs, reports, presentations, and email postings) he or she creates within a class and the University is not entitled to use any student work without the student's permission unless all of the following criteria are met:

- The work is used only once.
- The work is not used in its entirety.
- Use of the work does not affect any potential profits from the work.
- The student is not identified.
- The work is identified as student work.

If the use of the work does not meet all of the above criteria, then the University office or department using the work must obtain the student's written permission.

Download the UNT System Permission, Waiver and Release Form

Transmission and Recording of Student Images in Electronically-Delivered Courses

1. No permission is needed from a student for his or her image or voice to be transmitted live via videoconference or streaming media, but all students should be informed when courses are to be conducted using either method of delivery.
2. In the event an instructor records student presentations, he or she must obtain permission from the student using a signed release in order to use the recording for future classes in accordance with the Use of Student-Created Work guidelines above.

3. Instructors who video-record their class lectures with the intention of re-using some or all of recordings for future class offerings must notify students on the course syllabus if students' images may appear on video. Instructors are also advised to provide accommodation for students who do not wish to appear in class recordings.

Example: This course employs lecture capture technology to record class sessions. Students may occasionally appear on video. The lecture recordings will be available to you for study purposes and may also be reused in future course offerings.

No notification is needed if only audio and slide capture is used or if the video only records the instructor's image. However, the instructor is encouraged to let students know the recordings will be available to them for study purposes.