CHEMISTRY 3530 – Physical Chemistry for Life Sciences

Spring 2026

Course Information

CHEM 3530-001
Lecture: MWF, 11:00 am to 12:20 pm, CHEM 106

Instructional Team

Instructor: Dr. Rebecca Weber
E-mail: rebecca.weber@unt.edu
Phone: 940-369-7883
Office: CHEM 261
Drop-in hours: Mondays, Wednesdays, 1:00 – 1:50pm; Fridays, 10:00 – 10:50am
If you need to meet outside of normal drop-in hours, please make an appointment.

TA: Sophie Ntipouna
E-mail: sophientipouna@my.unt.edu
Office: Hickory 151
Drop-in hours: Tuesdays, Fridays, 3:00 – 4:00pm

Course Overview

This is a one-semester survey course of physical chemistry with a focus on topics in the biochemistry and biological areas. We will cover thermodynamics, solutions and phase equilibria, chemical equilibrium, chemical and enzyme kinetics, and photochemistry.

My goal for this semester is that you will develop an appreciation for physical chemistry and how it can be applied to biological and biochemical problems, as well as how to apply various math skills and theories to solve chemical problems.

Learning Outcomes

At the end of this semester, you should be able to do the following:

1. Explain atomic and molecular behavior on both the microscale and macroscale levels.
2. Apply knowledge of the three laws of thermodynamics to solve problems involving basic thermodynamic processes for both real and ideal gases.
3. Evaluate various chemical equilibrium systems, including phase transitions, chemical reactions, and solutions, by applying the principles of thermodynamics.
4. Analyze kinetic data to determine rates and mechanisms of chemical reactions, as well as evaluate proposed reaction mechanisms based on experimental data.

5. Demonstrate knowledge of math and physics by applying that knowledge to solve mathematical problems related to thermodynamics and kinetics.

Recommended Text

Physical Chemistry for the Life Sciences, 2nd Ed. Peter Atkins, Julio de Paula

Prerequisites: CHEM 1420 or 1423.

You will also need a scientific calculator. No prior experience with calculus is required.

Tentative Course Calendar

Chapter Title	Approx. Start Date
Introduction and Fundamentals Review (Chapter "F")	1/12
Chapter 1 – The First Law	1/21
Chapter 2 – The Second Law	2/2
Chapter 3 – Phase Equilibria	2/16
Chapter 4 – Chemical Equilibrium	2/27
Chapter 5 – Thermodynamics of Ion and Electron Transport	3/4
Chapter 6 – The Rates of Reactions	3/23
Chapter 7 – Accounting for the Rate Laws	4/8
Chapter 8 – Complex Biochemical Process	4/21

Note: Dates and topics are subject to the speed of the class.

January 19th – MLK, Jr. Day, university closed
March 9th – 13th – Spring Break, university closed
April 30th – Last day of classes
Check http://calendar.unt.edu/event-calendar/Academics for other important dates!

I reserve the right to change or modify the syllabus at any time. If changes are made, students will be notified during scheduled class times and the revised syllabus will be made available on Canvas.

HOMEWORK

Homework will be "assigned" but not collected, to help ensure your understanding of the topics presented in class. Homework problems will be assigned from the exercises at the end of each chapter and solutions will be posted on the class Canvas page. Supplemental homework problems will also be handed out for each chapter.

Although homework is not collected and does not directly affect your grade, you are **strongly encouraged** to complete the homework problems, as the exam questions will be similar in nature to homework question and problems worked in class.

It is best to bring problems with course material to the recitation hour, drop-in hours, or to the Chemistry Resource Center (CRC), located at CHEM 231. If help is needed, make sure that you

bring the problem in question, all materials such as lecture notes and the textbook, and what you have attempted already.

Infographic Project

In the second half of the semester, you will be working on an infographic about a current researcher in the area of physical or biophysical chemistry. You will create an infographic that includes a brief background of their education, their research area, and the significance of it. The researcher should be a member of a traditionally underrepresented group within STEM – female, persons of color, AAPI, Hispanic, Latinx, LGBTQ+, scientists with disabilities, etc. In addition, you will create a second infographic about a scientist of interest to you. You will upload your infographics to a discussion board in Canvas and we will have a virtual "poster session", where you will see everything that your peers have put together.

More information will be provided within Canvas, including an outline of due dates and grading rubrics.

EXAM DATES AND GRADING POLICY

There will be **FOUR** 2-part exams that are comprised of roughly 50-60% multiple choice (taken in class and through Canvas) and 40-50% short answer problems (as a take-home). Each exam will have 100 points possible.

All exams must be taken at the regularly scheduled times. Exams cannot be taken outside the scheduled time. There will not be any makeup exams. A missed exam will count as your dropped test (unless there is a well-documented serious illness, requiring hospitalization).

Exam 1 (100 points) – February 9th
Exam 2 (100 points) – March 16th
Exam 3 (100 points) – April 6th
Exam 4 (100 points) – April 27th
Final Exam (200 points) – Monday, May 4th, 10:00 am to 12:00 pm

PLAN ACCORDINGLY FOR THE TEST DATES!
If classes are cancelled by the university on the day of a scheduled exam, then the test is automatically scheduled for the next class lecture period.

You are expected to bring the following items to each exam: a writing utensil (preferably a pencil with a good eraser) and a scientific calculator. Cell phones, tablets, laptop computers, or other electronic devices will NOT be allowed! Scratch paper will be provided.

If you must leave the room at any time during an exam, you must turn in your exam to the instructor before leaving and will not be allowed to continue with the exam afterwards.

In addition, there will be a weekly quiz, every Friday at the beginning of class. The quizzes will be worth 10 points total, with the quizzes comprising 14% of your total grade.

Your average will be calculated after dropping the lowest of the hourly exams. If a student receives a "0" because of cheating, that grade **cannot** be used as the dropped grade.

COURSE GRADES

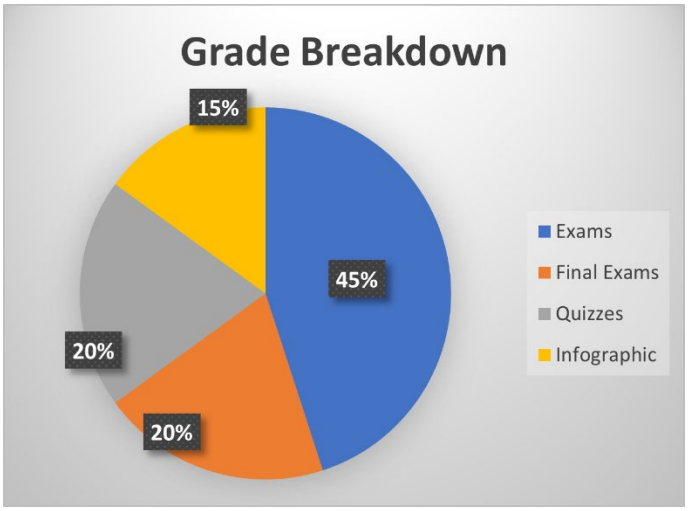
100.0% - 90.0% possible points – A
89.9% - 80.0% possible points – B
79.9% - 70.0% possible points – C
69.9% - 60.0% possible points – D
59.9% - 0.0% possible points – F

EXTRA CREDIT WILL **NOT** BE OFFERED!

Points breakdown

4 exams @ 100 pts each (lowest exam grade dropped)	45%
10 quizzes @ 10 pts each (lowest quiz grade dropped)	20%
Infographic Project	15%
Final Exam	20%

Total = 700 points total



ATTENDANCE AND CLASSROOM BEHAVIOR

Attendance is required at the lecture. Please be sure to log into iClicker during every class day, to log attendance as well as participate in the class.

Lectures will begin and end as noted at the beginning of the syllabus, so if you are late to class or anticipate having to leave early, please sit as close to the door as possible to minimize the disruption to the rest of the class.

Disruptive behavior such as talking, giggling, snoring, talking on a cell phone, playing on the Internet or texting, etc, will not be tolerated. Cell phones need to be muted during class. A student engaged in disruptive behavior can be asked to leave class immediately and can be suspended from class for a period of up to a week for the first offense, and longer if the behavior persists.

Taking photographs, video or audio recording of me or presentation materials without my explicit permission. In addition, **earbuds or headphones are not allowed to be used during class time**, unless you have a specific documented need for them. If this is the case, please see the Office of Disability Access (ODA) to ensure that the appropriate paperwork has been filed. https://studentaffairs.unt.edu/office-disability-access

OTHER NOTES

By university regulations, a grade of "I" (Incomplete) cannot be given as a substitute for a failing grade in a course. It is up to you to be aware of class withdrawal deadlines if you should choose to drop this course, as I will not do it for you.

Regarding dissemination of information, I exclusively use Canvas to email the entire class with reminders of deadlines, changes to classroom policies, etc. In addition, I post the lecture notes and grades on Canvas. Please make it a habit to check Canvas at least twice a week.

I will not respond to email received from non-UNT email address, especially concerning grade information. With a personal email address, I cannot be certain that it is you on the other end. As such, please use your official UNT email address to email me. But I welcome emails at any time!

The academic dishonesty policy is listed on the next page of the syllabus, but cheating is not tolerated in this course. This is what I consider cheating: using the internet to figure out how to answer a graded assessment (i.e., exam or quiz) question; asking anyone how to answer a graded assessment question, whether the person is currently registered in the course or not; asking previous students for their work completed in this course in a previous semester; using your own work completed in this course in a previous semester; uploading anything into your calculator or phone and using that to answer graded assessment questions; working with another student to answer "take-home" graded assessment questions (unless specifically told to; even then, you need to make sure that the work is clearly yours and not just copied from someone else's paper, even if you work together). Please note that this *does not apply* to homework, which is not a graded assessment question. If you made it through that entire paragraph, send me an email with a cute picture of your favorite animal. The first ten emails that I receive will get 5 extra credit points on their first exam.

Remember that the whole point of assessments in class is to determine, and give you the opportunity to demonstrate, how well you have learned this information. I also use assessments as a measure of how well I am teaching the material – if no one is answering questions on a particular topic correctly, that tends to say that I am not teaching it as well as I thought I was.

ACADEMIC DISHONESTY Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam. Additionally, the incident will be reported to the Dean of Students, who may impose further penalty. According to the UNT catalog, the term "cheating" includes, but is not limited to: a. use of any unauthorized assistance in taking

quizzes, tests, or examinations; b. dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; c. the acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university; d. dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or e. any other act designed to give a student an unfair advantage. The term "plagiarism" includes, but is not limited to: a. the knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and b. the knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

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 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. The Code of Student Conduct can be found at http://deanofstudents.unt.edu.

ADA STATEMENT The University of North Texas 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 you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You 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 Office of Disability Accommodation website at http://disability.unt.edu. You may also contact them by phone at (940) 565-4323.

EMERGENCY NOTIFICATION & PROCEDURES UNT uses a system called Eagle Alert to quickly notify you 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). The system sends voice messages (and text messages upon permission) to the phones of all active faculty staff, and students. Please make certain to update your phone numbers at http://www.my.unt.edu. Some helpful emergency preparedness actions include: 1) know the evacuation routes and severe weather shelter areas in the buildings where your classes are held, 2) determine how you will contact family and friends if phones are temporarily unavailable, and 3) identify where you will go if you need to evacuate the Denton area suddenly. In the event of a university closure, please refer to Canvas 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. You have a right to view your individual record; however, information about your records will not be divulged to other individuals without the proper written consent. You are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the university's policy in accordance with those mandates at the following link: http://essc.unt.edu/registrar/ferpa.html

STUDENT PERCEPTION OF TEACHING (SPOT)

Student feedback is important and an essential part of participation in this course. The Student Perception of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available at the end of the semester to provide you with an opportunity to evaluate how this course is taught.

SUCCEED AT UNT UNT endeavors to offer you a high-quality education and to provide a supportive environment to help you learn and grown. And, as a faculty member, I am committed to helping you be successful as a student. Here's how to succeed at UNT: **Show up. Find Support. Get advised. Be prepared. Get involved. Stay focused.** To learn more about campus resources and information on how you can achieve success, go to http://success.unt.edu/

HEALTH AND WELLNESS SUPPORT: UNT and the Chemistry Department care about your health and wellness. Below you will find some of our campus-based, local, and national resources for health and mental health support. These services can be used for you or to help you support a friend. As this list is not exhaustive, please visit https://studentaffairs.unt.edu/push/unt-resources for more information and additional resources on health and wellness.

Counseling and Testing Services **https://studentaffairs.unt.edu/counseling-and-testing-services**	**Health and Wellness Center** **https://studentaffairs.unt.edu/student-health-and-wellness-center**
UNT Police **https://police.unt.edu/**	**Substance Abuse Center** https://studentaffairs.unt.edu/rise/programs/sure-program
UNT Food Pantry **https://studentaffairs.unt.edu/food-pantry**	
National Suicide Prevention Lifeline (includes Veteran support services) **1-800-273-TALK**	Trevor Project/LGBTQ Support 866-488-7386

Commitment to Respect for All:

As members of the UNT community, we have all made a commitment to be part of an institution that respects and values the identities of the students and employees with whom we interact. UNT does not tolerate identity-based discrimination, harassment, and retaliation so we will work as a class to collaborate in ways that encourage inclusivity. We view diversity as encompassing the intersecting identities that make us unique individuals, including (but not limited to) ethnic/racial identity, nationality, sexual and LGBTQ+ identity, gender identity and expression, age, religious/spiritual beliefs, socioeconomic status, body shape/size, physical ability status, and varying points of view.