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**CHEMISTRY 3230** – Advanced Physical Measurements

Physical Chemistry I Lab, Fall 2025

# **COURSE INFORMATION**

CHEM 3230-301 (Lab) – Wednesday, 6:00pm – 8:50pm

CHEM 3230-302 (Lab) – Thursday, 3:00pm – 5:50pm

All meet in CHEM 280

# **INSTRUCTOR INFORMATION**

Dr. Rebecca Weber

E-mail: [rebecca.weber@unt.edu](mailto:rebecca.weber@unt.edu)

Office: CHEM 261

Phone: 940-369-8433

Office Hours: Monday, Wednesday, 1:00pm – 2:00pm; Friday, 10:00am – 11:00am

If you need to meet with me outside of normal office hours, please make an appointment.

# **TEACHING ASSISTANTS**

Name: Kriti Alam Name: Dipesh Shrestha

Email: [kritialam@my.unt.edu](mailto:kritialam@my.unt.edu) Email: [dipeshshrestha@my.unt.edu](mailto:dipeshshrestha@my.unt.edu)

Office Hours: Mondays, 3:00pm – 4:00pm Office hours: Tuesdays, 3:00pm – 4:00pm

Office: CHEM 115 Office: CHEM 262

**Prerequisites:** CHEM 3510 (or concurrent enrollment) and its prerequisites: CHEM 1420/1422/1423; MATH 1720 or 1830 (2730 is recommended); PHYS 1520/2220

NOTE: This course assumes prior knowledge of Calculus I and II and Multivariable Calculus, as well as Mechanics and Electromagnetism.

# **COURSE DESCRIPTION**

Collection and treatment of experimental data within the subjects of calorimetry, gases, vacuum line techniques, phase and chemical equilibria, polarimetry, and kinetics.

# **OBJECTIVES**

Physical Measurements is part of a two-course sequence designed to provide students with a fundamental understanding of the techniques used to collect and analyze experimental data within the broad fields of thermodynamics, physical and chemical equilibria, and chemical kinetics.

# **EXPECTED LEARNING OUTCOMES**

Using hands-on experiences develop a deep understanding of fundamental physical chemistry principles, which include the following:

1. Utilize physical chemistry techniques to analyze, evaluate, and synthesize information.
2. Develop, interpret, and express physical chemical ideas through written communication.
3. Manipulate numerical data to form conclusions.

# **REQUIRED TEXTS AND MATERIALS**

* Scientific calculator that is unable to connect to the internet
* Department approved safety glasses or goggles
* *Physical Chemistry*, Atkins, any edition (recommended)
* *Physical Chemistry Lab Manual*, Marshall. Available for download in Canvas.

# **Schedule of Experiments** (Schedule subject to change if necessary; updates will be posted on Canvas)

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| --- | --- | --- |
| **Week** | **Date** | **Experiments** |
| 1 | 8/18 | No Lab class meeting |
| 2 | 8/25 | No Lab class meeting |
| 3 | 9/2 | Review Pre-Lab Instructions, Expt 1 and 2 |
|  | 9/3, 9/4 | Group A: Expt 1; Group B: Expt 2 |
| 4 | 9/8 | Review Pre-Lab Instructions, Expt 1 and 2 |
|  | 9/10, 9/11 | Group A: Expt 2; Group B: Expt 1 |
| 5 | 9/15 | Review Pre-Lab Instructions, Expt 3 and 4 |
|  | 9/17, 9/18 | Group A: Expt 4; Group B: Expt 3 |
| 6 | 9/22 | Review Pre-Lab Instructions, Expt 3 and 4 |
|  | 9/24, 9/25 | Group A: Expt 3; Group B: Expt 4 |
| 7 | 9/29 | Lab report #1 writeup and peer review |
|  | 10/3 | Completed lab report due to TA |
| 8 | **10/8, 10/9** | **Lab quiz #1 – complete through Canvas – no labs** |
| 9 | 10/14 | Review Pre-Lab Instructions, Expt 5 and 6 |
|  | 10/15, 10/16 | Group A: Expt 5; Group B: Expt 6 |
| 10 | 10/20 | Review Pre-Lab Instructions, Expt 5 and 6 |
|  | 10/22, 10/23 | Group A: Expt 6; Group B: Expt 5 |
| 11 | 10/27 | Review Pre-Lab Instructions, Expt 7 and 8 |
|  | 10/29, 10/30 | Group A: Expt 8; Group B: Expt 7 |
| 12 | 11/3 | Review Pre-Lab Instructions, Expt 7 and 8 |
|  | 11/5, 11/6 | Group A: Expt 7; Group B: Expt 8 |
| 13 | 11/10 | Lab report #2 writeup and peer review |
|  | 11/14 | Completed lab report due to TA |
| 14 | **11/19, 11/20** | **Lab quiz #2 – complete through Canvas – no labs** |
| **11/24 – 11/28 – Fall Break and Thanksgiving – no labs** | | |

**These dates are subject to change, depending on the speed of the class!**

Check http://calendar.unt.edu/event-calendar/Academics for important class dates!

# **GRADING CRITERIA**

**Course evaluation:**

1. Lab quizzes 20%
2. Lab reports 50%
3. Written reports 30%

You are *required* to view all material posted for each experiment during the week in which the experiment is intended to be conducted (see calendar above). The questions for the quizzes will be pulled from the material emphasized in the lab lectures, which are intended to give you an overview of the theory and experimental procedure.

Lab reports *must be turned in* through Canvas by Friday at 11:59pm. It must be neat and organized. One of each type of calculation must be shown. Significant figures will be considered. Data will be collected in groups, but the work turned in will be individual work. The lowest score will be disregarded when computing the final grade.

The written report is a typed, formal lab report that will be produced for TWO experiments of your choosing. You will choose one experiment from the first half of the semester (Expts. 1 – 4) and one from the second half of the semester (Expts. 5 – 8). It will include: a cover sheet with your name, group number, and experiment title; Introduction, Procedure, Results, Discussion, and References (include section headers for clarity). Correct usage of the English language, including grammar and punctuation, will be expected in this lab report.

You will turn in a *completed* draft of your formal reports for peer review. This peer review will be a part of your overall grade. You must turn in a completed first draft of the lab report (see weekly calendar). Your completed lab report, including the edits from your peers, will be due to the TAs by the end of that week. More information will be provided on Canvas concerning this.

**There are no makeups for (unexcused) missed labs.** **There will be no extra credit offered.**

Lab Safety:

* Safety glasses or goggles MUST be work in the lab *at all times*.
* Closed-toed shoes must be work in the lab.
* Shorts are permitted, but are *highly* discouraged.
* On the first day in the lab, your TA or instructor will point out the safety devices in the lab.
* Do not work alone in the lab or without the supervision of the TA or the instructor.
* Do not perform unauthorized experiments.
* No eating or drinking is allowed in the lab.

**Regrade policy:** Requests to have an assignment regraded must be made within **1 week** of receiving the graded assignment. The request should be in the form of an email from your UNT email account to the TA that graded the assignment; the email should contain an explanation of how the problem was graded incorrectly.

**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.

# **USE OF GENERATIVE AI**

You are not allowed to use generative AI, including large language models, to create any work for this course, regardless of if the program is publicly available or your own personal program. If you are suspected of using any AI to write any assignment, it will be treated as a violation of the UNT academic integrity policy.

# **LEGAL NOTICE REGARDING NOTES**

My lectures and notes are protected by state common law and federal copyright law. You are authorized to take notes in class thereby creating a derivative work from my lecture, but the authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to record my lectures, to provide your notes to anyone else (hard copy or electronically), or to make any other use of them without express prior permission from me in writing.

# **Other UNT Policies**

**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.

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| [Counseling and Testing Services](https://www.monmouth.edu/counseling/)  <https://studentaffairs.unt.edu/counseling-and-testing-services> | [Health](https://www.monmouth.edu/substance-awareness/) and Wellness Center  <https://studentaffairs.unt.edu/student-health-and-wellness-center> |
| [UNT Police](https://www.monmouth.edu/mupd/)  <https://police.unt.edu/> | **Substance Abuse Center**  <https://studentaffairs.unt.edu/rise/programs/sure-program> |
| [UNT](https://www.2ndfloor.org/) Food Pantry  <https://studentaffairs.unt.edu/food-pantry> |  |
| National Suicide Prevention Lifeline (includes Veteran support services)  1-800-273-TALK | [Trevor Project/LGBTQ Support](https://www.thetrevorproject.org/?gclid=EAIaIQobChMIlrXmxMa95wIVFHiGCh02-QEhEAAYASAAEgLKkfD_BwE)  866-488-7386 |

## **Workplace diversity: It's more than just a gender issue | Training ...Commitment to Our Community**

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.

# **Laboratory Safety Rules and Agreement**

## **Chem 3230 Advanced Physical Measurements**

1. Safety goggles or glass must be worn at all times while in the lab.
2. Closed-toed shoes are required for admittance into the lab.
3. Long pants are strongly suggested.
4. Long hair and loose clothing must be confined or tied back.
5. Food, drink, and gum are not allowed in the lab at any time.
6. Horse play, pranks, and other acts of mischief are strictly forbidden.
7. Casual visitors are not allowed in the labs. Only the instructors, stockroom personnel, students in the scheduled lab section, and other approved faculty or staff of the department are allowed in the lab.
8. Students are not allowed to conduct unauthorized experiments.
9. Know the locations of and proper use of all safety equipment in the lab.
10. Notify your TA or instructor immediately of any injury, spill, fire, or explosion. ALL INJURIES AND ACCIDENTS, REGARDLESS OF SEVERITY, MUST BE REPORTED. Clean up non-hazardous spills immediately. Never clean up a spill of hazardous material unless it can be done safely with assistance from your instructor.
11. In the event of a true emergency, call 911. Do not call 911 without consent from your TA or instructor. If your TA or instructor is injured and unable to consent, do not hesitate to call 911.
12. NEVER TASTE ANY LAB MATIERALS. SMELL AMTERIALS ONLY IF INSTRUCTED TO DO SO.
13. Keep your lab space clean and organized.
14. NEVER LEAVE AN ONGOING EXPERIMENT UNATTENDED!
15. NEVER REMOVE CHEMICALS FROM THE LAB.
16. NEVER PIPETTE BY MOUTH.
17. Dispose of broken glassware and other materials as directed by the TA or instructor. Dispose of all chemical waste properly, as directed by the TA or instructor. Treat any chemical as if it were hazardous.
18. Listen to your TA an instructor at all times. Follow any other rules and guidelines as laid out by them.

Please sign and date below, indicating that you have read these rules and agree to follow them while enrolled in this course.

I, the undersigned, understand that participating in chemistry laboratory courses might expose me to potential hazards. I have read and understand the above safety rules and agree to abide by them and follow the directions of the TA, instructor, or other chemistry faculty and staff as appropriate. I agree to act responsibly and safely in the laboratory at all times.

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

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