CHEM 372: PHYSICAL CHEMISTRY LABORATORY

FALL 2025

Instructor: Dr. Tran-Ba (he/him) **Office**: SC 5301J (Office hours)

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Office Hours: Wednesday & Friday: 11 am – 12 pm; or by appointment (via email)

COURSE TIMES AND LOCATION

Lab: on Thursday, 1:00 – 4:50 pm in SC 5327 (August 28th – November 20th, 2025)

No Lab: on November 27th, 2025 (Thanksgiving Break)

COURSE COMMUNICATION

The best way to contact me is via my email address. I will do my best to reply to your email as soon as possible (within one business day). Emails received after 5:00 pm or during the weekend will be replied to on the next business day. You are encouraged to check the Blackboard site and email daily for important updates.

COURSE DESCRIPTION

This is an advanced laboratory course in physical chemistry emphasizing the theory and practice of selected topics covered in the lecture. You will learn how professional physical chemists determine the structure, composition, and behaviors of materials in various liquid and gas samples using a variety of advanced experimental techniques and analytical instruments. Topics to be examined include solution viscosity, thermodynamics, microwave and infrared spectroscopy, chemical kinetics, and electrochemistry. You will also be trained to quantitatively analyze data and critically interpret the obtained experimental results and findings in formal laboratory reports.

COURSE OBJECTIVES

The course objectives include, but are not limited to, performing relevant physical chemistry experiments, analyzing collected data sets, and interpreting the obtained results in a formal lab report. Upon completion of this course, students will (1) have a deeper understanding of the relevant physicochemical concepts and their applications, (2) have gained numerous advanced data analysis skills, (3) have improved their ability to interpret/discuss scientific data, and (4) have learned to write a concise scientific summary. Ultimately, all participating students are well-prepared for their future independent careers in the chemical industry or academia.

COURSE PREREQUISITE

A grade of '*C*' or better in Analytical Chemistry (CHEM 210 or CHEM 220) and Principles of Physical Chemistry (CHEM 345). Please note that CHEM 345 can be taken concurrently with CHEM 372.

REQUIRED MATERIALS

- Textbook: "*Experiments in Physical Chemistry*" by Joseph W. Nibler, Carl W. Garland, and David P. Shoemaker, 8th edition, 2009, McGraw-Hill.
- Safety googles, a black ultra-fine point permanent marker and a bound composition notebook
- A scientific calculator (capable of solving square roots, logarithms, and exponential functions).

Please note: ''Cook Library has placed a copy of the textbook (EXPERIMENTS IN PHYSICAL CHEMISTRY) on course reserves. You can borrow the book from the library for free for two hours at a time by going to the Ask Us Desk on Cook Library's main floor, asking for the title, and presenting your OneCard.''

ATTENDANCE POLICY

Attendance at laboratory sessions is ***mandatory***. Importantly, all material covered in class could be covered in the oral and final exams. Therefore, it is your responsibility to obtain copies of any missed material from a colleague if not otherwise available on Blackboard. Make sure to arrive on time and stay for the entire duration of each lab until all your experiments have been completed. This will help you to avoid missing out on any relevant material for an exam. If you must leave earlier or arrive later, please email me in advance to notify me about this unavoidable circumstance.

POLICY CONCERNING ELECTRONIC DEVICES

Any non-emergency use of cell phones such as calling, texting, or using the phone calculator, etc. during lab is ***prohibited***. You must turn off your cell phone or place it in silent mode before entering the classroom. The use of a smartphone during the exams will be treated as academic dishonesty and will be strictly sanctioned. Using a laptop for notetaking and data analysis is acceptable. Any other use of a laptop including messaging, social media, and related activities, is ***prohibited***.

EVALUATION AND GRADING

Grades will be based on 500 total points, including 350 points from six postlab assignments (four informal and two formal reports), and 150 points from the oral and final exams. This is outlined in the table below:

Lab Evaluation	Description	Contribution to Final Grade
Oral Exam	Notebook Interview (on December 4th)	50 pts
Written Exam	Final Exam (on December 9th)	100 pts
Lab Assignment	Lab 1: Viscosity (Informal Report)	50 pts
	Lab 2: Heat Capacity (Informal Report)	50 pts
	Lab 3: Chemical Kinetics (Formal Report)	75 pts
	Lab 4: Dipole Moment (Informal Report)	50 pts
	Lab 5: Electrochemistry (Informal Report)	50 pts
	Lab 6: Spectroscopy (Formal Report)	75 pts
	Total Points	**500 pts**

Exam: Both exams will be taken on the scheduled date, as shown in the table above. **No make-up exam will be given.** If you miss the oral exam due to an unavoidable and *documented* reason, your percentage final exam score will also be your percentage score of the missed oral exam. The final exam is open-book and students are allowed to use a hand-written, one-page formula sheet during the final exam. The use of any unauthorized resources (e.g. Chegg) is strictly prohibited and will automatically result in an '*F*x' for the entire course. The date and time of the final exam have been set by the university and cannot be changed (see *Course Schedule*).

Make-up Policy: If a student misses a lab due to an unavoidable, *documented* reason, the student will be allowed to obtain the experimental data from another student needed for lab reporting. This policy will not be applicable to the student for any other reasons (e.g. conflicts with other exams, work schedule, or travel plans) than illness, or a serious personal/family emergency (with proper documentation from the Office of Dean of Studies). Student athletes should contract the instructor on the first day of classes to discuss their travel plans and the required accommodation. Any absence is treated as unexcused until appropriate documentation is provided. If the final exam is missed due to any reason, the student's grade will be on hold until the final examination has been retaken in one of the subsequent semesters.

Lab assignments: Details on these assignments will be provided on Blackboard. Grades for lab assignments will be reduced by up to 50% if you do not attend all lab periods associated with the assignment (except unavoidable absences with documentation). All lab assignments are due two (2) weeks after completion of the lab. The formal lab assignment is to be completed *individually*; informal lab assignments are to be completed as a group. Assignments should be submitted as a PDF file on Blackboard. It is your responsibility to ensure that your assignments are complete and free of any technical errors (e.g., formatting issues). Hard copies will not be accepted.

Lab Exit Interview: This interview will assess your comprehensive understanding of the principles and techniques emphasized in the experiments and associated data analysis. Additional details will be provided later in the semester.

Late Policy: Lab assignments received late will be assessed a 10% late fee per calendar day (deducted from the total points available on the assignment). Lab assignments submitted more than three (3) calendar days late will receive a grade of zero. Early submissions are encouraged. Technological issues (e.g., Internet service disruption) are not valid reasons for missing submission deadlines. **Do not wait until the last minute to submit assignments.**

Final Course Grade: Final grades will be assigned based on the total points earned in this course. The final letter grades will be based on the grading scale shown below. There is no 'curve' for this course. For additional details please go to TU's Grades and Grading Policies.

% of Total Points Earned	Minimum Total Points	Final Grade
≥ 93.0	465	A
90.0 – 92.9	450	A^-
87.0 – 89.9	435	B^+
85.0 – 86.7	415	B
80.0 – 84.9	400	B^-
75.0 – 79.9	375	C^+
70.0 – 74.9	350	C
65.0 – 69.9	335	D^+
60.0 – 64.9	300	D
≤ 59.9	Below 300	F

STATEMENTS OF DEPARTMENT OF CHEMISTRY

Statement on Academic Dishonesty. Academic dishonesty is described in Towson University's Student Academic Integrity Policy and is to be followed by all students, faculty, and staff. Any student who is found to be responsible for academic dishonesty will be assigned a penalty up to and including a grade of zero for the involved academic work. Any suspected academic dishonesty will be reported to the department chairperson and to the Office of Student Conduct & Civility Education for further investigation.

Statement on Accommodations for Students with Disabilities. Students with approved accommodations must submit their DSS memos to the instructor *the first week of class*. It is the student's responsibility to present this paperwork and to follow up regarding accommodations that require instructor participation (e.g. testing accommodations). Please contact Disability Support Services with any further questions.

Statement on Classroom Diversity and Inclusion. The students, faculty, and staff at Towson University represent a diverse and vibrant community of learners and scholars. As a community, we value the unique contributions of each individual and promote active participation in all aspects of the learning process by each community member. Your instructor supports Towson University's goal of fostering a diverse and inclusive educational setting. Your instructor strives to create a classroom environment built upon the principles of mutual respect and support. Toward this end, all members participating in this course are expected to demonstrate respect for all other members of the class. If you feel these expectations have not been met, please speak with your instructor or the designated diversity liaison, Dr. Zeller (czeller@towson.edu). For further information regarding the diversity and inclusion policies of Towson Univ, please see Towson University's "Strategy 1:Exposure to Diversity", the Fisher College of Science and Mathematics Diversity Action Plan, and the Chemistry Department Diversity Action Plan.

Statement on Masking in Classroom. The University has set clear expectations about mask wearing for the safety of all in our community. Face coverings over the nose and mouth are always required while indoors. There are no exceptions to this rule. Students not wearing a mask--or wearing a mask improperly--will be asked to wear a mask or to fix their mask position. Any student refusing to put on or wear a mask will be asked to leave the classroom immediately. Students who have additional incidents with the mask expectation after a first warning will be referred to the Office of Student Conduct for failure to comply with this University directive.

Statement on Disruptive Behavior. Disruptive behaviors are not acceptable. When students' behaviors become disruptive to class, students will be removed from the classroom immediately. Depending on the nature and level of disruptive behaviors, the instructor may report students to the CARE team of Student Affairs Office. If the incident occurs before the final withdrawal date, students must withdraw from the course. If the withdrawal period has expired, students will receive the earned grade up to the date on which the incident occurs.

Laboratory Policy for Pregnant Students. Pregnant students should consult their physicians for advice on whether to perform experiments in the laboratory. Students are encouraged to provide their physician with a list of the chemicals that they might be exposed to while in lab. They should also check the MSDS sheets (available in the Department) to be aware of the hazards of the chemicals. If a student is advised against performing laboratory work, then faculty must make accommodations for the student. Any accommodations should comprise a workload that is approximately equivalent to the regularly scheduled laboratory work. These accommodations may include: Performing "dry" experiments only, in a place free from exposure to ongoing experiments, performing the wet chemistry later, receiving an incomplete grade in the course pending completion of experimental work.

Statement on Copyright. Your instructor retains all copyrights to all original materials distributed in this course including, but not limited to, lab reports, notes, worksheets, lab materials, and exams. Reposting, selling, or otherwise distributing these materials in any fashion at any time is prohibited.

COURSE SCHEDULE

Week	Date	Activity/Topic
1	08/28	Syllabus, Expectations and Guidance
2	09/04	1st Lab Rotation (1st week)
3	09/11	1st Lab Rotation (2nd week)
4	09/18	2nd Lab Rotation (1st week)
5	09/25	2nd Lab Rotation (2nd week)
6	10/02	3rd Lab Rotation (1st week)
7	10/09	3rd Lab Rotation (2nd week)
8	10/16	4th Lab Rotation (1st week)
9	10/23	4th Lab Rotation (2nd week)
10	10/30	5th Lab Rotation (1st week)
11	11/06	5th Lab Rotation (2nd week)
12	11/13	6th Lab Rotation (1st week)
13	11/20	6th Lab Rotation (2nd week)
14	11/27	Thanksgiving Holiday (No Lab)
15	12/04	Notebook Interview (No Lab)
	12/09	In-Class Final Exam: 12:30 – 2:30 pm