CHEM 3411 PHYSICAL CHEMISTRY I FALL 2026

Class Meetings
11:00 – 11:50, Monday, Wednesday, & Friday,
Classroom: Klaus A2447

Dates: Aug. 24, 2026 Classes begin
Holidays: Sept. 7, 2026, Oct. 5-6, 2026 Fall Break, Nov. 25-27, Thanksgiving Break

Withdrawal Deadline: November 2, 2026
Final Instructional Days: December 7-8, 2026
Final Exam: Friday, Dec. 11, 11:20 -2:10 PM

Instructional Staff
Thomas Orlando, Ph.D. Instructor ,
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Office Hours: Monday, 12:30 – 2:00 or by appointment

TA–TBD TA Hours TBD

Textbook
Physical Chemistry: Principles and Applications in Biological Sciences, Fifth Edition, by Tinoco, Sauer, Wang, Puglisi, Harbison, & Rovnyak, Pearson, 2014, ISBN-13: 978-0-13-605606-5. Some information will also be taken from Physical Chemistry, Thermodynamics, Structure and Change, PW. Atkins, 10 th. edition. ISBN-13 9781429290197

Formal and Suggested Prerequisites
Freshman Chemistry is the only formal prerequisite.
Knowledge of material covered in Calculus I, II, and III and calculus-based Physics is helpful. A tutorial of some basic math skills will be given at the beginning of the course.

Description
This is the first of a two-semester sequence of courses in physical chemistry for students of science and engineering. This course covers chemical thermodynamics and kinetics. CHEM 3412 covers quantum chemistry.

Communications
Canvas (https://canvas.gatech.edu) will be used for e-mail correspondence with the entire class and for posting of archival information such as lecture slides, homework assignments, solutions to homework problems and exam questions, and supplementary material.

Grading Policies:

Course grades will be based on attendance, graded homework, two exams and a final exam that, according to the published Final Exam schedule, will be given at 11:20 am on Dec. 10. Attendance is required and will count as 5% of the grade. Homework will count 15% of the course grade. The exams and final exam will be weighted in ***whichever of the following is most advantageous to the student***: Each class exam counts 22.5% and the final exam counts 35% ***or*** each in-class exam counts 15% and the final exam counts 50%. The honor code and proctoring protocol will be implemented and followed on all on assignments and exams. Extra credit assignments will be given through-out the class and will be numerically added as additional HW assignments. Thus, full participation in all the extra credit assignments can result in an additional percentage point or two (max) added to the overall final numerical course grade. This can and has made up the difference for borderline grade cases.

Changes in Exam Grades
Changes in exam grades must be requested via the canvas website within *one week* of the class period that the graded exam is returned to students.

Make-up Exams
The only valid reasons for missing an exam are illness, validated emergencies, or absence while participating in official Georgia Tech business. Make-ups will only be given if illness is verified by a note from a doctor or if advance notice of absence for official Georgia Tech business is given along with documentation from appropriate Georgia Tech personnel. Exams must be made up as soon as possible following an excused absence, since return of graded exams will be held up until all make-ups are completed.

More about Homework
Homework problems will be assigned periodically and will be graded. Students are encouraged to collaborate on homework, but each student must turn in their own solutions (in their own writing). Students should show enough information that the grader can check not only the correctness of the answer but also the approach employed to arrive at the answer. ***Working problems (both assigned homework problems and others) is an essential part of exam preparation.***

Borderline Grades: If a student is on the borderline between two grades, the decision on whether they should get the higher or lower grade will be based on (1) class attendance and participation (2) performance on the final exam and (3) completion of extra-credit assignments. ***Class attendance is required and participation is strongly encouraged***.

Honor Code/Academic Integrity
Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities
If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Attendance and/or Participation
As stated above, class participation and attendance are required. Please see http://www.catalog.gatech.edu/rules/4/ for more information about institute expectations and restrictions around attendance, including information about excused absences.

Student-Faculty Expectations Agreement
At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See http://www.catalog.gatech.edu/rules/22/ for an articulation of some basic expectation that you can have of me and that we have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Resources for Students
In your time at Georgia Tech, you may find yourself in need of support. Below you will find some resources to support you both as a student and as a person.

Academic support

- Center for Academic Success http://success.gatech.edu
  - 1-to-1 tutoring http://success.gatech.edu/1-1-tutoring
  - Peer-Led Undergraduate Study (PLUS) http://success.gatech.edu/tutoring/plus
- OMED: Educational Services (http://omed.gatech.edu/programs/academic-support)
  - Group study sessions and tutoring programs
- Communication Center (http://www.communicationcenter.gatech.edu)
  - Individualized help with writing and multimedia projects
- Advising and Transition (https://advising.gatech.edu)
  - Study Strategies Seminar course https://advising.gatech.edu/gt2801-study-strategies-seminar
  - Academic coaching https://advising.gatech.edu/academic-coaching
  - Advising in your major http://advising.gatech.edu/

Personal Support
Georgia Tech Resources

- The Office of the Dean of Students: https://studentlife.gatech.edu/content/get-help-now; 404-894-6367; Smithgall Student Services Building 2nd floor

    - You also may request assistance at https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?
- Center for Assessment, Referral and Education (CARE) 404-894-3498; https://care.gatech.edu/
    - Smithgall Student Services Building 1st floor
    - Students seeking assistance from the Counseling Center or Stamps Psychiatry need to visit CARE first for a primary assessment and referral to on and off campus mental health and well-being resources.
    - Students in crisis may walk in during business hours (8am-4pm, Monday through Friday) or contact the counselor on call after hours at 404-894-2575 or 404-894-3498. Other crisis resources: https://counseling.gatech.edu/content/students-crisis
- Students' Temporary Assistance and Resources (STAR): https://studentlife.gatech.edu/content/star-services
    - Can assist with interview clothing, food, and housing needs.
- Stamps Health Services: https://health.gatech.edu; 404-894-1420
    - Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition
- OMED: Educational Services: http://www.omed.gatech.edu
- Women's Resource Center: http://www.womenscenter.gatech.edu; 404-385-0230
- LGBTQIA Resource Center: http://lgbtqia.gatech.edu/; 404-385-2679
- Veteran's Resource Center: http://veterans.gatech.edu/; 404-385-2067
- Georgia Tech Police: 404-894-2500; http://www.police.gatech.edu

National Resources

- The National Suicide Prevention Lifeline | 1-800-273-8255
    - Free and confidential support 24/7 to those in suicidal or emotional distress
- The Trevor Project
    - Crisis intervention and suicide prevention support to members of the LGBTQ+ community and their friends
    - Telephone | 1-866-488-7386 | 24 hours a day, 7 days a week
    - Online chat | 24 hours a day, 7 days a week
    - Text message | Text "START" to 687687 | 24hrs day, 7 days a week

Statement of Intent for Inclusivity

As a member of the Georgia Tech community, I am committed to creating a learning environment in which all of my students feel safe and included. Because we are individuals with varying needs, I am reliant on your feedback to achieve this goal. To that end, I invite you to enter into dialogue with me about the things I can stop, start, and continue doing to make my classroom an environment in which every student feels valued and can engage actively in our learning community.

SCHEDULE OF TOPICS AND LECTURES (We will stick to this schedule as much as possible. You should read the assigned material prior to attending class).

Introduction to Physical Chemistry and Math tutorial

Lectures: Aug. 24 and 26
Reading: Chapter 1

The First Law of Thermodynamics
Lectures: Aug. 28, 31 Sept. -2, 4
Reading: Chapter 2

The Second Law of Thermodynamics
Lectures: Sept. 9- 23 (Sept. 23 Review)
Reading: Chapter 3

EXAM 1 (Friday, Sept. 25)

Free Energy and Chemical Equilibria
Lectures: Sept. 28 and 30. Oct. 2, 7, 9
Reading: Chapter 4

Physical Equilibria
Lectures: Oct. 12, 14, 16, 19, 21
Reading: Chapter 6

EXAM 2: (Friday, Oct. 23)

Electrochemistry
Lectures: Oct. 26, 28, and 30, Nov. 2 and 4 (**Note: WITHDRAWAL DEADLINE: Nov. 2, 2026)**

Reading: Chapter 7

Kinetics: Rates of Chemical Reactions
Lecture: Nov. 6, 9,11,13, 10, 12, 14, 17 and 19
Reading: Chapter 9

Statistical Foundations of Biophysical Chemistry
Lecture: Nov. 21 and 24
Reading: Chapter 5

REVIEW Lecture: Dec. 1

READING PERIOD Dec. 3

FINAL EXAM (currently scheduled for Dec. 10 at 11:20 AM)