LAST UPDATED: 1 April 2026

CHEM 1212 Laboratory

Chemical Principles II Laboratory
Summer 2026 | Georgia Tech

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LAB MEETINGS

Please see your course schedule in Buzzport for your officially assigned lab room, day, and time. Attending your officially scheduled lab section is required.

GENERAL INFORMATION AND CORE IMPACTS STATEMENT

Welcome to Chemical Principles II laboratory! In this lab course, we will apply scientific inquiry to address questions in analytical and inorganic chemistry. You will develop familiarity and skill with common techniques of chemical analysis such as spectroscopy and titration and techniques for chemical synthesis.

This is a Core IMPACTS course that is part of the STEM area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

This course should direct students toward a broad Orienting Question:

- How do I ask scientific questions or use data, mathematics, or technology to understand the universe?

Completion of this course should enable students to meet the following Learning Outcome:

- Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems, and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

- Inquiry and Analysis
- Problem-Solving
- Teamwork

INSTRUCTOR INFORMATION

Laboratory Coordinator
Dr. Michael Evans (mevans@gatech.edu)
Office Hours: Wednesdays and Fridays, 1 – 2 pm
Location: Clough Commons 584C

See the laboratory Canvas site for contact information for teaching assistants.

COURSE OVERVIEW

Chemical Principles II Laboratory is an introductory chemistry laboratory that focuses on analytical and synthetic chemistry. The course is designed to develop your experimental skills and technical writing skills as you collect evidence for the concepts, principles, and theoretical models discussed in lecture. In lab work is aimed at developing transferable data analysis, modeling, and scientific explanation and argumentation skills. Technical writing and presentation will be significant parts of this course. Lecture-related content topics addressed in experiments will include chemical kinetics, chemical equilibrium and applications thereof, acid-base chemistry, electro- and redox chemistry, and coordination chemistry. Developing comfort and accuracy when handling chemicals are important psychomotor goals of the course. Investing in CHEM 1212 laboratory will help you walk into advanced chemistry lab courses and research laboratories with confidence!

Pre- and Co-requisites
Chemical Principles I (CHEM 1211K) or equivalent is a pre-requisite for this course.

Learning Goals and Outcomes | Laboratory

1. **Design and carry out** chemical experiments by **formulating** research questions, **planning** procedures, and **safely using** standard laboratory techniques and equipment.

2. **Analyze and interpret** experimental data using appropriate mathematical, computational, and modeling tools to **evaluate** results and **identify** sources of error.
3. **Apply** chemical principles to **explain** observations and **draw** evidence-based **conclusions** supported by scientific reasoning.
4. **Communicate** scientific findings effectively through clear written reports, oral presentations, and well-maintained laboratory notebooks.
5. **Work collaboratively and connect** chemistry to real-world applications by engaging in teamwork and relating laboratory concepts to practical contexts.

COURSE REQUIREMENTS AND GRADING

Laboratory represents 22.5% of your course grade for CHEM 1212K (225 points of 1000). The course uses a *specifications grading* model that is designed to promote growth in your technical writing skills through the provision of minimum standards for your work ("specifications"), useful feedback on post-lab reports, and opportunities to revise and resubmit work that does not meet specifications.

The number of Laboratory points you earn toward your course total is determined entirely by the number of Lab and Post-lab Submissions that you pass. You must pass at least 5 Lab and Post-lab Submission assignments to pass CHEM 1212K as a whole.

Number of Lab and Post-lab Submissions Passed	Laboratory Points Earned
9	225
8	215
7	199
6	174
5	149
Less than 5	0

To open each Lab and Post-lab Submission assignment, completing the corresponding Pre-lab Quiz with a minimum score (typically 75 – 85%) is required. Pre-lab Quizzes do not otherwise figure into determination of your Laboratory points.

Tokens can be earned by completing various activities both inside and outside of the laboratory and spent to extend deadlines or open resubmissions of Lab and Post-lab Submissions. The following specific activities will earn tokens:

- Completing the Introduction to Laboratory assignment with a score greater than or equal to 90%
- Completing pre- and post-semester surveys
- Watching a pre-lab video to completion
- Attending office hours of your lecture instructor, lab instructor, or lab TA

- Completing a Certified Reagent Operation (CRO) in laboratory as operator or observer (see below for additional details)

Tokens can be spent in the following ways:

- Extending a Pre-lab Quiz deadline by 24 hours
- Retrying a Lab and Post-lab Submission assignment (to correct an error *prior to grading*)
- Extending a Lab and Post-lab Submission deadline by 3 days
- Opening a Resubmission *after grading* of the corresponding Lab and Post-lab Submission assignment

DESCRIPTIONS OF GRADED COMPONENTS

Lab Safety 101. Safety is essential in chemical laboratory work. Lab Safety 101 is the basic lab safety training offered by Georgia Tech Environmental Health and Safety. It will introduce you to essential policies and procedures related to safety that apply to research and teaching laboratories across the Institute. This assignment is mandatory; students who do not complete it will fail CHEM 1212K.

Introduction to Laboratory. This assignment will introduce you to course logistics, Microsoft Excel, basic measurement theory, laboratory reports, and fundamental chemistry concepts. Completion of this assignment with a score of 90% or more will earn you 2 tokens.

Pre-lab Quizzes. Knowing what you're doing in the lab and why you're doing it helps you be safe and efficient. Before lab, read the protocol and complete the pre-lab assignment built into Labflow (due at the start of lab). A completed pre-lab is required to receive credit for *and gain access to* Lab and Post-lab Submissions. This requirement will be enforced using Labflow.

Certified Reagent Operations (CROs). Developing familiarity and skill with foundational laboratory techniques is an important learning goal of CHEM 1212K laboratory. CROs are designed to recognize and reward accurate and precise technique. There are two roles to every CRO: operator and observer. The operator performs a chemical handling or measuring technique aiming for accuracy and precision (guidelines are available in technique tutorial videos in the CRO module in Labflow). The observer verifies that the operator's technique is in fact accurate and precise. Provided the operation is completed successfully, both operator and observer earn points. CROs should be completed naturally in the course of experiments; a very large number of opportunities will be available. Completion of CROs will earn tokens (see section on tokens).

Data Entry and Notebook Pages. Data, observations, and conceptual activities will be recorded on laboratory notebook pages during experiments. At the end of each lab session, scan and upload your notebook pages to the Labflow Lab Submission assignment. Use an app such as Genius Scan to scan and convert to PDF format. Concept Checks and Group Argumentation are in-lab conceptual activities that will be completed in your notebook pages. At the end of lab, completion of the "Data Entry" portion of the Lab and Post-lab Submission is required to unlock the ability to upload your lab report.

Lab and Post-lab Submissions. Instructions for post-lab assignments for each experiment will be provided on Labflow in the Calculations and Report section of Lab and Post-lab Submissions. Post-lab assignments will be submitted through Labflow at the bottom of this assignment. Post-lab assignments will focus on the development of robust technical writing, scientific argumentation, and data visualization skills. Post-labs are due the evening of your lab the following week at 11:59 pm.

General specifications for post-lab reports are as follows.

1. The report represents your own work accurately.
2. The report appropriately displays data and results.
3. Calculations and analysis mostly (≥ 70%) involve correct processes leading to values that follow from the data collected.
4. The report presents an argument concerning the research question that is logically consistent with experimental results.
5. The report connects relevant concepts and theory to experimental results to evaluate the quality of the latter.

COURSE MATERIALS AND WEBSITES

Canvas. There is a dedicated Canvas site for CHEM 1212 lab. The site includes this syllabus, a few other general resources for the course, a link to the lab Ed Discussion board, and announcements from the lab coordinator and TAs.

Labflow. The vast majority of materials and assignments for lab will be posted on Labflow, which is a learning management system built for chemistry laboratories. Purchase Labflow access from the bookstore well in advance of your first lab period.

Lab coat and safety glasses. A lab coat and safety glasses can be purchased from the bookstore or any other retailer. The lab coat should be 100% cotton. Safety goggles are not required.

POLICIES AND PROCEDURES

This is a ***residential*** course involving weekly in-person experiments. Each week, you will complete an experiment with a lab partner and conduct results analysis with

multiple other students. It is expected that you will attend all experiments and sufficient attendance is required to pass the course. Attendance at lab is required to submit assignments following completion of each pre-lab quiz.

Accommodations for Student 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. If you expect your accommodations to intersect with the laboratory, please inform Dr. Evans ***within the first week of the course or as soon as possible after registering with ODS.***

Academic Integrity, Collaboration, and Generative AI Policy
Although you will work with a lab group to complete experiments, all work for the laboratory must be prepared wholly by you. This means you must create your own data tables, plots, sample calculations, and text. The content of your post-lab assignments must be based solely on what appears in your lab notebook. Copying and pasting figures, tables, or text constitutes plagiarism and is a violation of the Georgia Tech Honor Code.

You are welcome to work with other students while completing assignments for lab, and your peers can be excellent resources for learning. However, to properly assess your learning and provide you with feedback that allows you to enrich yourself, work that you call yours must be produced wholly by you. You may not copy the work of another student or resource and *represent it as your own*. ***Additionally, sending any part of any work that you intend to turn in to another student is strictly prohibited.*** Sending and receiving work that will be turned in for grading are violations of the Honor Code of Georgia Tech and serious breaches of academic integrity.

Artificial intelligence (AI) can be a useful tool for learning and/or improving your writing, however, it should not serve as a substitute for your own understanding of the results of your experiments. Assignment submissions containing AI-generated text will be considered a violation of academic integrity for the purposes of First-year Chemistry laboratory courses. Any written work you submit should be original writing created by you alone. The use of AI to revise and/or improve your original writing in submitted assignments should be disclosed and cited for transparency.

TAs are bound by the Honor Code to notify the First-year Chemistry faculty of suspected plagiarism of laboratory work. If you are concerned about potential plagiarism associated with your work, please consult your teaching assistant before turning it in. Honor Code violations will initially be addressed by the faculty of the First-year Chemistry Program and will only be referred to the Office of Student

Integrity if a mutual agreement is not reached. For more information, please see the Georgia Tech Academic Honor Code.

Lab Attendance and Absences
Labs meet in a room on the fifth floor of Clough Commons and ***lab attendance is mandatory***. To earn credit for assignments related to an experiment, it is necessary to attend and collect your own data; using another students' data without attending lab is prohibited.

Consult with Dr. Evans prior to a planned absence from lab and set up a meeting with the Office of Student Life if applicable (see below). Excused absences include:

- Participation in athletics sanctioned by Georgia Tech.
- Cases in which the Office of Student Life issues an excused absence. These are issued for emergencies such as injury, illness, or death in the family. After your appointment with their office, they will contact your instructors to arrange accommodations. Please note that any absence due to illness must be accompanied by an email from the Dean of Students indicating that you have met with them and that they suggest excusing your absence.
- Religious observances.
- Absences sanctioned by the Student Academic and Financial Affairs Committee (SAFAC). Contact the committee at least three weeks prior to a planned absence.

Students with excused absences will be able to access provisional "virtual" data in Labflow that should be used to complete the post-lab assignment. See Modules → Course Resources → Absences to request an excused absence and for other important information regarding the course absence policy.

Students who arrive more than 15 minutes after the scheduled start of the lab period (in person) will be turned away and will not be allowed to perform the experiment in a different section. If you anticipate a recurring situation that will cause you to be late to your lab period, please inform your teaching assistant at the start of the semester. Please note that pre-lab assignments are due at the start of your lab period, will be unavailable after this time, and must be completed to submit remaining assignments in each experiment module. No laboratory work will be accepted after July 28, 2026.

PRIORITIZING WELLNESS
Taking care of yourself should be a top priority. It is important for you as a person first and as a student second. Utilizing good sleep practices, eating nutritious foods while incorporating indulgences, getting in some movement, and using good hand washing techniques all will go a long way to seeing you healthfully through the semester.

To minimize the risks to our health and a successful semester, I strongly encourage everyone to be fully vaccinated and to follow best practices when ill, including staying home and/or masking, out of respect for the health and safety of others.

We all have lives outside of this learning space and outside of Georgia Tech. Sometimes, things in our lives get in the way of work and studies. These may include challenges associated with relationships, mental health, physical health, alcohol or drug use, finances, and more. If you experience any of these (or something similar) then please know that you are not alone and that many folks on campus are available to help. You can find access to a comprehensive list of student services and resources compiled and maintained by the Office of the Vice President for Student Engagement and Well-Being. Some of these resources are also listed at the end of this syllabus.

- In an emergency, please call Georgia Tech Police Department at (404) 894-2500 or 911.
- For immediate mental health support, you can call the Center for Mental Health Care and Resources at (404) 894-2575.
- You can call or text 988 or chat at 988lifeline.org.

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SCHEDULE OF EXPERIMENTS

Week of	Activity or Experiment	Assignments Due
May 18	1 Kinetics of the Iodine Clock Reaction	Introduction to Laboratory Lab Safety 101 Pre-semester Survey Pre-lab 1
May 25	2 Measurement of an Equilibrium Constant	Pre-lab 2 Lab and Post-lab Submission 1
Jun 1	3 Acid-base Conjugates and Equilibrium	Pre-lab 3 Lab and Post-lab Submission 2
Jun 8	4 Water Quality	Pre-lab 4 Lab and Post-lab Submission 3
Jun 15	5 Acid-base Conjugates in Buffers	Pre-lab 5 Lab and Post-lab Submission 4
Jun 22	7 Acid-base Conjugates in Titration	Pre-lab 6 Lab and Post-lab Submission 5
Jun 29	7 Solubility Equilibria	Pre-lab 7 Lab and Post-lab Submission 6
Jul 6	8 Redox Potentials of Metals	Pre-lab 8 Lab and Post-lab Submission 7
Jul 13	9 Synthesis of a Metal Oxalate Poster Presentations	Pre-lab 9 Lab and Post-lab Submission 8 (Poster)
Jul 20	Cleanup and Checkout	Lab and Post-lab Submission 9
Jul 27	**No Lab**	—

RESOURCES FOR STUDENT SUPPORT

- Academic Success and Advising https://www.success.gatech.edu/
  - 1-on-1 Tutoring (Knack): https://www.success.gatech.edu/tutoring/1-to-1-tutoring/
  - Peer-Led Undergraduate Study (PLUS): https://www.success.gatech.edu/tutoring/plus/
  - Drop-In Tutoring: https://www.success.gatech.edu/tutoring/drop-in-tutoring/
  - Learning Assistant Program: https://www.success.gatech.edu/tutoring/learning-assistant-program/
  - Studypalooza: https://www.success.gatech.edu/tutoring/studypalooza/
- Advising and Transition https://www.success.gatech.edu/advising/
  - Academic major advising https://advising.gatech.edu/find-your-advisor
  - Exploratory advising https://advising.gatech.edu/exploratory-advising
  - Academic coaching https://advising.gatech.edu/academic-coaching
- Office of Student Achievement
- Communication Center (http://www.communicationcenter.gatech.edu)
  - Individualized help with writing and multimedia projects
- Mathematics Resources
  - College Algebra Open Course: https://gatech.instructure.com/enroll/MGFMYG
  - Precalculus Open Course: https://gatech.instructure.com/enroll/YAFYFG
- Personal Support
  - The Office of Student Life: https://studentlife.gatech.edu/; 404-894-6367; Smithgall Student Services Building, 2nd floor
  - You also may request assistance at https://studentlife.gatech.edu/request-assistance
  - Center for Mental Healthcare and Resources https://mentalhealth.gatech.edu; 404-894-2575 or 404-894-3498
  - 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
  - Belonging and Student Support: https://belonging.gatech.edu/studentsupport
  - Veteran's Resource Center: http://veterans.gatech.edu; 404-385-2067
  - Georgia Tech Police: 404-894-2500