CHEM 3216L Syllabus

Analytical Chemistry Laboratory, A01, A02, A03, A04, 2 Credits

Fall 2026

Instructor Information

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General Course Information

Description

Students will gain hands-on experience with analytical chemistry tools, techniques, methods, and instrumentation. We will also focus on experimental design, and data interpretation such as calibration methods and statistical analysis. Students will perform experiments on research-grade instrumentation and learn to make decisions based on their data.

Course Learning Outcomes

Enhance student's understanding of the principles of operation and essential components of analytical instrumentation.

Enable students to gain practical experience in using laboratory instrumentation similar to that employed by practicing scientists and engineers in industry, government laboratories, or academe.

Provide students with real-world analytical challenges and the tools to solve them.

Promote a high-level understanding of the applications of sampling, statistics, separation, and analysis in determining the composition of complex chemicals

Required Course Materials

Principles of Instrumental Analysis, Skoog, Holler, and Crouch, 6th or 7th edition, Cengage. ISBN-13: 978-0-495-01201-6. Available at Georgia Tech Barnes and Noble Bookstore. eBook available.

Lab coat made of 100% cotton, Available at Georgia Tech Barnes and Noble Bookstore.

Safety Glasses (which are both splash and shatter resistant), Available at Georgia Tech Barnes and Noble Bookstore.

Grading Policy:

Assignment	Description	Total Points
Pre-labs	Each experiment has a pre-lab assignment which will help you to understand the underlying concepts of the experiment and to prepare for your lab session.	400 pts (8 experiments x 50 pts each)
Post-labs	Experiments will be followed by a post-lab assignment. These assignments will typically be administered through Canvas quizzes and will consist of the following sections: ○ Results (Tables, Figures, and Calculations) ○ Accuracy ○ Post-Lab Questions	400 pts (8 experiments x 50 pts each)
Lab Exam	Written test covering calibration methods and data analysis	150 pts
Professionalism	Student conduct in the laboratory will be monitored and evaluated each week in the following categories. 1. Timeliness 2. PPE and Appropriateness of Clothing 3. Laboratory Housekeeping 4. Preparedness (including familiarity with the protocol)	50 pts
TOTAL		1000 pts

Your earned points will be added and divided by the total points possible. The final grade will be assigned as a letter grade according to the following scale:

A	> 90%
B	80-89%
C	70-79%
D	60-69%
F	<59%

Description of Graded Components

PRE-LAB ASSIGNMENTS

- Each experiment has a pre-lab assignment which will help you to understand the underlying concepts of the experiment and to prepare for your lab session. Some pre-labs will contain calculations which MUST be completed before you are able to perform the experiment.
- Pre-lab assignments will be **due 24 hours before the start of your lab period**
    - Any pre-lab submitted after this time will incur a deduction of 10 pts
    - Any pre-lab not completed before your lab period begins will be awarded 50% of the points earned.
    - Pre-lab assignments will not be accepted after the post-lab for that experiment is due.

POST-LAB ASSIGNMENTS

- Most experiments will be followed by a post-lab assignment. These assignments will be administered through Canvas quizzes and will consist of the following sections:
    - Results (Tables, Figures, and Calculations)
    - Accuracy
    - Post-Lab Questions
- Post-lab assignments will be due at 11:59 PM the day following your experiment.
- Late assignments will only be accepted at the discretion of the instructional staff. Students must contact Dr. O'Mahony to request an extension and revised deadlines will need to be established. Late assignments will not be accepted without written permission of an extension. Documentation may be required to justify granting an extension on an assignment.

PROFESSIONALISM

- ❑ Enter the Analytical Laboratory **wearing safety glasses**! Over-the-glasses (OTG) safety glasses or goggle must be worn over eyeglasses for suitable safety protection for the eyes.
- ❑ **Wear suitable clothing** in the Analytical Chemistry Laboratory. Natural fibers (such as cotton) are safest. Students should be clothed from the torso to the feet.

- Sandals, shorts and open-toed shoes are not permitted in the lab.
- Ankles should never be exposed in the lab.
- Capri pants are not permitted in the lab.
- Shoes must completely cover the top of the foot.
- Leggings are insufficient solely as pants for the lab.

- ❑ **Wear a laboratory coat** at all times while working with chemicals in the Analytical Chemistry Laboratory. The coat may be made of 100% cotton, a 65%/35% polyester/cotton blend, or any higher-grade safety fabric. Typical lab coats being sold on campus are full-length. Aprons will not suffice.
- ❑ Follow all safety regulations and encourage others around you to work safely as well.
- ❑ Do not eat, drink, chew gum or have anything in your mouth while in the laboratory. Do not bring food or drink (including bottled water) for consumption into the laboratory. Do not leave unconsumed drink bottles including bottled water visible in the laboratory.
- ❑ Do not discard food trash in the laboratory.
- ❑ Keep the balance and instrumentation areas clean and free from clutter.
- ❑ Be sure to report any malfunctions in equipment to the TA or instructor.
- ❑ Solutions prepared by students should be clearly labeled including the chemical's name, date of preparation, name of the person who prepared the reagent, and its NFPA diamond information for safety. Store chemicals appropriately.
- ❑ Wear nitrile gloves when working with dangerous chemicals. Nitrile gloves are available for daily use to avoid this problem and to prohibit contamination of laboratory experiments.
- ❑ Wash your hands carefully before leaving the laboratory.
- ❑ Students are expected to read laboratory protocols prior to reporting to lab. Be sure to review all links and/or videos associated with a laboratory protocol.
- ❑ Students are expected to follow written procedures for conducting assigned experiments.

More details about expectations will be given during the course introduction.

Course Policies

Attendance and/or Participation

Attendance is required for all sessions of CHEM 3216L laboratories. You must attend your assigned laboratory section.

Timeliness in reporting to each laboratory session is imperative due to safety.

If you arrive more than ten minutes late, you will be dismissed from the lab for the day and will receive a zero on that day's lab assignment.

- All excused absences must be obtained in writing by email. E-mail Dr. O'Mahony for an excused absence.
    - You will be expected to contact the Dean of Students' office to obtain an excused absence, and they will also need to contact Dr. O'Mahony
    - If you are given an excused absence, your instructor and TAs will work with you to either make up the missed experiment or to provide you data so that you can complete the post-lab without attending an additional lab session.
        - Your work relating to that laboratory must be completed within two weeks of the missed assignment. This two-week period can be extended with the written permission of Dr. O'Mahony.
- You must provide as much advanced notice of an absence as possible (minimum of 2 weeks' notice for a planned absence and within 3 days for an unplanned absence).

Comprehensive guidelines regarding class attendance and excused absences can be found in the Georgia Tech catalog. Please read through the policies in their entirety.

http://www.catalog.gatech.edu/rules/4/

http://www.catalog.gatech.edu/policies/student-absence-regulations/

IMPORTANT: To ensure you gain adequate hands-on experience in the laboratory, **you must perform at least 6 in-person experiments**. If prolonged or repeated absences prevent you from completing the minimum in-person experiments, you will not be able to make-up or be provided with data for any further experiments. In this case, you may not be

able to complete the course and will need to work with the Office of the Dean of Students to find a solution.

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. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism 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 (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail us as soon as possible in order to set up a time to discuss your learning needs.

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. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.

Pre- &/or Co-Requisites

Pre-Requisite: CHEM 2216 and CHEM 2216L

Co-Requisite: CHEM 3216

Collaboration, Group Work, and Use of Generative AI

You are encouraged to work with classmates on data analysis and to study with others outside of class. Collaboration on prelab quizzes is acceptable, and you should keep in mind that the effort you put into these assignments will be reflected in what you gain from them.

The use of any other student's previously submitted CHEM 3216, CHEM 3211, or CHEM 3281 laboratory reports or data is prohibited in this course. The term "use" is to be construed in the broadest way possible. You may not own, view, reference, or possess any

other student's CHEM 3216, CHEM 3211, or CHEM 3281 laboratory reports or data from any semester. This applies to electronic and paper copies. This applies to non-final revisions and draft copies. Using, owning, viewing, referencing, or possessing other students' previously submitted laboratory reports will be considered a direct violation of academic policy and will be dealt with according to the GT Academic Honor Code.

You are explicitly forbidden from giving other students access to your CHEM 3216 laboratory reports. This includes drafts, non-final revisions, and submitted copies. This applies to both paper and electronic copies. Giving other students access to your laboratory report will be considered a direct violation of academic policy and will be dealt with according to the GT Academic Honor Code.

You are permitted to work together with other students who are currently taking the course (including but not limited to your laboratory partner) and are encouraged to discuss your reasoning and thought processes. However, the generation of answers, phrases, lab reports, numbers, and figures must be your own individual work. Submission of a lab report that has elements taken directly from someone else's work constitutes plagiarism.

Definitions of these terms are given in Georgia Tech's Policy Library for Academic Misconduct.

You are permitted to use AI-based assistance, such as Chat GPT and Copilot, the same way you collaborate other people meaning:

- You are welcome to talk about your ideas and work with other people, both inside and outside the class, as well as with AI-based assistants. However, all work you submit must be your own.
- You should never include in your assignment anything that was not written directly by you without proper citation (including quotation marks and in-line citation for direct quotes).
- Including anything you did not write in your assignment without proper citation will be treated as an academic misconduct case.
- You are not permitted to Copy your conversation with an AI assistant. You can copy your own work into your conversation, but do not copy anything from the conversation back into your assignment.
- Instead, use your interaction with the AI assistant as a learning experience, then let your assignment reflect your improved understanding.
- Do not have your assignment and the AI agent open at the same time.

- Similar to above, use your conversation with the AI as a learning experience, then close the interaction down, open your assignment, and let your assignment reflect your revised knowledge.

Ways to Avoid Academic Misconduct:

- Do not possess or use laboratory reports or raw/processed data from former students.
- Perform data analyses independently at all times.
- Complete assignments independently unless otherwise specified.
- Do not quote others in the text of any assignments in this course. Instead, practice developing mature technical writing skills by expressing your ideas in your own words.
- Do not copy chemical structures, chemical reactions/mechanisms, or any other artwork from others, particularly published work (even if cited) and definitely other students. Published work is copyrighted and should not be reprinted as part of laboratory reports without explicit permission from the editor.
- Do not use a past or present peer's laboratory report as a role model. The tendency to copy phrases, expressions, data and/or ideas is too prevalent. Such collaborations are not authorized.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late assignments will only be accepted at the discretion of the instructional staff. Students must contact Dr. O'Mahony to request an extension and revised deadlines will need to be established. Late assignments will not be accepted without written permission of an extension. Documentation may be required to justify granting of an extension on an assignment.

Equipment and Supplies Replacement

In the event that glassware, plasticware, equipment and supplies are damaged or broken by students, the student may be required to pay for the replacement of those items with his/her Buzz Card. Students are expected to report any damage, destruction, or other incidents involving equipment, materials, and supplies to the teaching assistant and/or instructor.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses.

Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)