Course Syllabus

CHEM 2380: Synthesis Lab I

Summer 2026, All Sections, 2 credits

Professor:	Dr. Heidi L. van de Wouw Boggs Chemistry Office Suite Heidi.vandeWouw@chemistry.gatech.edu	***Pre-Lab Lecture:***	Lecture Hall tbd M/W or T/R 12:30 – 4:45 pm
Materials:	Available on Canvas.	***Help Hours:***	After pre-lab lectures and by appointment.
TA Office Hours:	**Weekly TA office hours are listed on the course Canvas site** or use e-mail to contact TAs directly. All TA office hours are open to any student currently enrolled in the course.		

Course Description: This organic chemistry laboratory course will provide you with an opportunity to learn about the synthesis, separation, purification, and identification of organic compounds in a hands-on manner. The experiments in this course are designed to help you develop the observational and critical thinking skills that are essential prerequisites for a successful career in science (or any professional field). You will be expected not only to perform the experiments in the laboratory, but also to think about the principles behind the experiments.

Prerequisites: You must have passed CHEM 1212K/1312/1313/2211 and CHEM 2311 and have passed or have concurrent enrollment in CHEM 2312/2313.

Student Learning Outcomes: By the end of the course, you will be able to:

- Propose an experimental plan to work efficiently in a laboratory.
- Evaluate safety, handling, and disposal procedures for reagents found in a laboratory.
- Maintain an organized and well-documented lab notebook.
- Perform fundamental organic chemistry techniques (including thin layer chromatography, melting point analysis, recrystallization, extraction, gas chromatography, mass spectrometry, and IR and NMR spectroscopy) for the analysis of laboratory experiments.
- Identify and explain the chemical principles underlying fundamental techniques.
- Accurately draw arrow pushing mechanisms for reactions conducted in the lab.
- Determine the structures of unknown molecules using spectroscopic data.
- Make claims supported by evidence using experimental data.

E-mail Etiquette: When emailing your Instructor:

- Include ***what section you are in*** and ***who your TA is***.
- Use only your official gatech.edu address.
- Always email your instructor as early as possible, especially for rescheduling lab experiments due to excused absences or discussing a plan to get your grade back on track.
- For non-urgent matters, do not send multiple follow-up e-mails within 24 hours; e-mail is not typically monitored on weekends, so plan accordingly.
- Salutations are commonly expected in the professional world; include these!

Equipment and Materials: Students will need to bring a cotton or cotton blend lab coat and safety glasses to each laboratory session, as well as wear appropriate attire (long pants, closed toed shoes). All course materials will be provided through the course Canvas site. You will use LabArchives, available from GT, to prepare for and document laboratory experiments.

- *LabArchives* will allow you to make a plan for each laboratory experiment as part of your pre-lab, record your actions and observations as part of your in-lab, and explore safe laboratory practices as part of your safety reflections. You will need to export pages from your LabArchives electronic lab notebook (ELN) as .pdf files for submission to Canvas.

Attendance: Class time is invaluable time for us to meet together as a class and for us to practice and discuss complex topics to clarify understanding. As such it is important that you come to each class, ready to participate and learn with your fellow students. If you are unable to attend class for any reason, expected or not, please let me know as soon as possible so we can make appropriate arrangements, including sharing missed material with you. Pre-lab lectures will be held in person (unless otherwise communicated over Canvas announcements) and attendance will be monitored *via* participation in pre-lab lecture activities. Labs will also be held in person and you must attend and complete all experiments to be eligible to earn a passing grade in the course. A detailed absence policy is included in a separate document in the "Getting Ready" module.

- *Laboratory Admittance.* For safety, students must complete all required pre-lab work by ***9:00 pm*** the day before each lab. No student will be permitted to enter the lab if they have missing or incomplete pre-lab work. In addition, all students must have the required PPE and be wearing proper attire. What constitutes proper attire may be found in the "Laboratory Safety Policies" document on Canvas. If you arrive to lab more than 15 minutes after the start of the lab, you will not be permitted entry and must contact the instructor to see what, if any, make-up lab accommodations may be granted. If you repeatedly disobey safety policies, including failure to wear PPE or eating or drinking in lab, you will be asked to leave and you may not be able to make up the experiment. Student and TA safety is paramount in this course.

Class Communications: This class will utilize our course Canvas site for posting resources and class communications and Perusall (accessible through Canvas) for reviewing experimental procedures. Announcements will be made by me and your TAs on Canvas and it is your responsibility to ensure you monitor these announcements for important information. E-mail is recommended for one-on-one communication with your Instructor and/or TAs. In this class, your learning will be supported by a team: you, your classmates, your TAs, and me. On the first day of class, we will come together as a learning team to establish a set of class norms that are respectful to all in this class and your learning.

Accommodations: As a GA Tech faculty member, I am dedicated to supporting *all* students in my courses and making this course accessible for everyone. If you have suggestions that will help me to make this course more accessible for you or your classmates, please do not hesitate to bring these to my attention. I encourage you to meet with me early in the semester to discuss accommodation needs for this course. If you need academic accommodations or have any questions about the accommodations procedure, please contact the Office of Disability Services (ODS) at (404)-894-2563 or https://disabilityservices.gatech.edu/ at the beginning of the semester to ensure that appropriate accommodations are made in a timely fashion.

Standards of Academic Integrity: GA Tech is an academic community in which all members are expected to abide by ethical standards both in their conduct and in their learning. The Institution expects students to understand and adhere to basic standards of honesty and academic integrity. For more information see the GA Tech Academic Honor Code and Student Code of Contact.

These standards include but are not limited to the following:

- In projects and assignments prepared independently, students never represent the ideas or the language of others as their own.

- In laboratory projects involving the collection of data, students accurately report data observed and do not alter or fabricate data for any reason.
- Students do not provide assignments to other students, including drafts, non-final revisions, and submitted work, either while enrolled in or following enrollment in the course.
- Students do not destroy, alter, or access in an unauthorized manner the work of others.
- Students do not destroy or alter educational resources and materials of the Institution.
- Students neither give nor receive assistance with examinations.
- Students do not represent work completed for one course as original work for another.
- Students do not deliberately disregard course rules and regulations, make false claims of performance, alter grades, falsify statements or documentation, nor distort any facts.

All students are expected to adhere to the GA Tech Academic Honor Code and all instances of potential academic dishonesty will be referred to the GA Tech Office of Student Integrity (OSI). If you have questions on how to best represent your work, especially collaborative work, please ask your Instructor for feedback and guidance before submitting your assignments.

Academic Support: In addition to established Student-Faculty Expectations, GA Tech offers many programs and centers to support student learning and academic success. I urge you to take advantage of these resources as the skills you develop at this stage in your learning will benefit not only your college career but also your professional life.

Tips for Success:

- *Ask questions.* This can be in pre-lab lectures, in lab, during office hours, or on Perusall. Synthesis lab is a course that will challenge both your knowledge and your physical abilities, and I know this content is not always easy to pick up. Your learning team consisting of your Instructor, your TAs, and peers in your class is a valuable resource for you to have your questions answered, so ask these questions!
- *Make connections.* You are in a class with peers working to learn the same content as you. Be willing to ask peers for direction and be a team member that helps others. Through collaborative learning my hope is you will feel less isolated, you will gain understandings from your peers, and you can reinforce your understandings by assisting others.
- *Think through experiments.* Ask yourself "what is the point" of each step of an experiment. By the end of the course you should be able to understand a problem to be solved and what steps you should go through to solve this problem. Also, if you know the why of what you are doing, it will become easier to identify when and how an experiment might go wrong and help you to troubleshoot your way to promising solutions.

Grading Policy: This class is designed to promote deep learning by providing assignments that you are responsible for completing before, during, and after class and by using a system called ***specifications grading***. Both are designed to allow you to continually revisit concepts and provide you the flexibility to reattempt and resubmit assignments. Research has shown that a regular practice of learning and revisiting tough concepts will aid in your long-term understanding of the material. Specifications grading, namely assignments grading on a binary "satisfactory/needs revision" scale, may be new to you and you will notice that in this course concepts will be repeatedly encountered throughout multiple experiments and in final assessments. I understand that concepts may not be immediately mastered, but with regular practice throughout the semester I believe that everyone can participate in assessments at a high degree of proficiency. In fact, with specifications grading it is

encouraged that all students earn the highest grades for there is no "curving" of the grading scale.

- *How Do I Earn the Grade I Want?* A set of guidelines for each letter grade is outlined in the "Student Grade Tracker" handout posted on Canvas. To earn a letter grade, complete all the requirements listed for that grade. These requirements consist of satisfactorily completing specific numbers and types of assignments where more assignments must be completed satisfactorily to earn higher letter grades. If you are missing any requirement for a letter grade, your final grade will default to the lowest grade earned in any category. Check your grade tracker against your assignments regularly to stay on track.
- *What Does "Satisfactory" Mean?* Earning a satisfactory grade on an assignment means that you have met or exceeded the minimum requirements to pass that assignment, which vary by assignment and are always listed on the rubric. The threshold for passing an assignment is based on the achievement of proficiency, NOT perfection. You can make mistakes and still pass, but you should aim to submit the highest quality assignments.
- *How Will I Know if My Assignment is "Satisfactory?"* If the assignment is assessed as "Satisfactory," it will show up as "Complete" in the gradebook. If it is not assessed as "Satisfactory," it will show up as "Incomplete" in the gradebook. Assignments that are "Incomplete" (except pre-labs) are classified as "Needs Revision."
- *What Do I Do if My Assignment "Needs Revision?"* An assignment assessed as "Needs Revision" may be treated in one of two ways:

    1. You may revise and resubmit the assignment in exchange for a certain number of tokens. Check the "Token Trade-In List" to see how many tokens are required to revise and resubmit an assignment that was assessed as "Needs Revision." A post-lab report, for example, requires 1 token and the post-lab must be revised and resubmitted within 3 days of receiving the "Needs Revision" assessment. You only need to revise sections that were marked as "No Marks" on the rubric. Any revised content MUST be highlighted in yellow so your TA may easily find and regrade the parts of the assignment that required revision. Note that all revised and resubmitted assignments must still follow the formatting rules detailed in the assignment instructions.
    2. You may choose to accept the "Needs Revision" assessment and move on. This is an option because you do not need to earn a "Satisfactory" assessment on every single assignment in the course. Be sure to check the "Student Grade Tracker" for details on how many assignments must be assessed as "Satisfactory" to earn each letter grade.

- *What Are Flex Tokens?* Flex tokens are a form of digital currency for this course that are designed to be your safety net. You can exchange tokens for a variety of things in the course such as a 24-hour late pass for an assignment, an opportunity to revise and resubmit an assignment that was assessed as "Needs Revision," and several other options. Check out the "Token Trade-In List" on Canvas to see all the things you can exchange tokens for and how many tokens are required for each exchange. You can earn four tokens at the start of the course by completing the "How I Earned…" assignment by the end of the first week of the term. Up to four additional tokens may be earned during the course by completing surveys and other special assignments so watch out for these opportunities!

- *How Do I Redeem My Flex Tokens?*
    1. Check your token balance on Canvas. Token balances are updated weekly. If you KNOW that you already used a token, but your balance has not changed yet, you are responsible for knowing and being honest about your current token status. Token dishonesty counts as a violation of the Academic Integrity Policy!
    2. Fill out the "Token Trade-In Request Form" on Canvas.
    3. Follow the instructions in the form and then save a .pdf of your responses and e-mail to either your section's in-lab TA, head TA, or Instructor (dependent on request type).
- *Additional Grading Policies:*
    - It is your responsibility to ensure your assignments are submitted on time, follow all required formatting rules, and are submitted to Canvas correctly.
    - Any assignments that do not follow formatting rules will not receive feedback and will be automatically assessed as "Needs Revision."
    - If an assignment is submitted late or improperly, feedback and an assessment may still be given. However, if a late assignment is assessed as "Satisfactory" it will not count toward meeting the requirements for a letter grade unless a late pass is used.

Graded Assignments:

Item	Frequency	Due
Pre-Lab Lectures (10)	weekly	see schedule
Quizzes & Video Quizzes	variable per experiment	night before lab
Pre-Lab Notebook (9)	one-two per experiment	night before lab
Lab Experiments (9)	weekly	during your lab section
In-Lab Notebook (9)	one-two per experiment	night of lab
Safety Reflections (9)	one-two per experiment	night of lab
Post-Lab Reports (8)	one per experiment	~6 days after lab
Technique Finals (3)	TLC*, recrystallization**, and acid-base extraction**	*mid-semester **semester end
Knowledge Check (1)	once	semester end

Pre-Lab Lecture Participation. Participation will be evaluated by submission of work completed during the lecture. To earn credit, you must attend the entire lab lecture and participate in all activities.

Quizzes & Video Quizzes. To prepare you for lab and each experiment, materials will be available to you to review. Quizzes are designed to assess your comprehension of the content. You will have two attempts for each quiz and the higher of the two scores will be kept. Must be completed on Canvas by 11:59 pm the day before the lab.

Pre-Lab Notebook. The pages of your LabArchives ELN must be submitted to Canvas as a .pdf by ***9:00 pm*** the day before the lab. A rubric is included in each Canvas assignment for reference.

In-Lab Notebook. The pages of your LabArchives ELN must be submitted to Canvas as a .pdf by 11:59 pm the day of the lab. A rubric is included in each Canvas assignment for reference.

Safety Moment Reflections. At the beginning of every lab, you will participate in a 10- to 15-minute safety moment, an activity that will expose you to one or more lab safety topics. To earn credit for participating in the safety moment, you must submit a reflection by 11:59 pm the day of the lab. Your reflections will be graded based on how well they address the prompts included in the assignment instructions.

Post-Lab Reports. Each experiment will have a post-lab report you must submit to Canvas as a PDF by 11:59 pm about six days following the experiment (if this falls on a lab-break week, the post-lab report will be due the following week). A rubric is included in each Canvas assignment for reference.

Laboratory Finals. There are two components to the final:

1. *Technique Finals* (in-person, during lab period): Perform experiments to demonstrate lab techniques (TLC, recrystallization, acid-base extraction). You will need to write and diagram procedures for the techniques, solve relevant calculations, and perform error analysis. There will be one Technique Final Retake session at the end of the semester.
2. *Knowledge Check Final* (online, during lecture period): Answer multiple choice questions about laboratory fundamentals covered in the course. There will be one Knowledge Check Final Retake at the end of the semester.

Grade Calculation: Your final course grade will be determined using the specifications grading system described above in the "Grading Policy" section. To earn a passing grade in the course, the following minimum requirements must be met in ALL assignment categories. Please note that the "D" grade will not be awarded in this course.

Item	Minimum to Earn A	Minimum to Earn B	Minimum to Earn C
Pre-Lab Lectures (10)	9/10 required	8/10 required	7/10 required
Quizzes & Video Quizzes	≥ 90% (cumulatively)	≥ 80% (cumulatively)	≥ 70% (cumulatively)
Lab Experiments (9)	9/9 required	8/9 required	7/9 required
In-Lab Notebook (9)	7/9 satisfactory required (incl. Exp. 6)	6/9 satisfactory required (incl. Exp. 6)	5/9 satisfactory required (incl. Exp. 6)
Safety Reflections (9)	7/9 satisfactory required	6/9 satisfactory required	5/9 satisfactory required
Post-Lab Reports (8)	6/8 satisfactory required (incl. Exp. 8)	6/8 satisfactory required (incl. Exp. 8)	5/8 satisfactory required (incl. Exp. 8)
Technique Finals (3)	3/3 required	2/3 required	1/3 required
Knowledge Check (1)	≥ 70%	≥ 70%	≥ 70%