

# CHEM 2312 Syllabus

Organic Chemistry II – Lyon (3 cr.)  
Summer 2026

## Instructor Information

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## General Course Information

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CHEM 2312 builds on the concepts covered in Organic Chemistry-I through exploration of the structure and reactivity of conjugated and aromatic systems as well as carbonyl containing compounds, carboxylic acids and their derivatives, amines, and enols and enolates. The course focuses on understanding how structure relates to the mechanistic pathways of reactions and the development of strategies to synthesize complex organic molecules. Connections are provided to biological processes, medicinal chemistry and industrial applications.

## Course Learning Outcomes

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Apply fundamental principles of molecular structure, conjugation, and aromaticity to predict stability of compounds, intermediates and transition states.

Understand the connection between structure and the mechanistic pathway of reactions such as to predict the outcomes of reactions.

Design multistep synthetic strategies to prepare complex value-added organic compounds.

## Required Course Materials

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The course will make use of curated open source and authored resources that will be provided via Canvas. The textbook material will be provided for download in the form of PDF files. There is no required textbook to purchase.

## Grading Policy:

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Exam 1	Modules 1 and 2	100 points
Exam 2	Module 3	100 points
Exam 3	Module 4	100 points
Exam 4	Modules 5 and 6	100 points
<i>Final exam period:</i>		
Exam 5	Module 7	100 points*
Final	Comprehensive	100 points*
Homework		100 points

Your lowest score from exams 1-5 score will be dropped. This means that your course grade will be calculated based on 600 points.

Course grades. The following scores will guarantee a particular grade. However, the grade cut-offs might be lowered slightly (they will not be raised).

A: 90% (540/600)

B: 80% (480/600)

C: 65% (390/600)

D: 50% (300/600)

## Course Policies

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### Attendance and/or Participation

Attendance is not required other than for exams. However, most students will realize significant benefit from: (1) attending every, and (2) maintaining regular study habits to make sure and steady progress through the course material.

*Note that the shortened timeframe of the study abroad program means that material is covered in an accelerated manner.*

### 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.

### Core IMPACTS

This is not a Core IMPACTS course

### 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 me as soon as possible in order to set up a time to discuss your learning needs. Because of the accelerated schedule of the course and remote location, we will find a mutually agreeable means of provide the accommodation.

### 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, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

### **Prerequisite**

CHEM 2311 or equivalent with a minimum grade of D.

### **Collaboration, Group Work, and Use of Generative AI**

Collaboration outside of class – including on graded homework assignments – and discussion in class are both highly encouraged. Work on exams must be your own. Generative AI might be useful to you in generating summaries of course materials. *However, it is prone to frequent and significant errors when applied to problem solving.*

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

Given the accelerated nature of the course, I want to return graded assignments and answer sets as soon as possible to benefit all students in the class. Given this, all work will be due by the announced deadlines (the schedule will be published on Canvas).

If you will miss an exam due to illness, please let the instructor know as soon as possible. Attempts will be made to provide an option to take a make-up exam.

### **Inclement Weather and Digital Learning Days**

These will be set based on local conditions. The instructor will communicate modifications to the schedule as soon as possible. To the extent possible we will make use of digital delivery to maintain the schedule of topics in the class.

### **Student Use of Mobile Devices in the Classroom**

Students may make use of mobile devices in the classroom *for course related purposes only*. Devices may not be used during the exam periods.

### **Institute-approved absences**

Institute-approved absences will be honored upon presentation of documentation from the Office of Student Life/Dean of Students Office. If the absence covers the due date of an assignment or an exam, you will receive an extension to the day after the approved absence.

### **Re-grading of assignments**

Exams will be graded and returned as soon as possible. If you want any work considered for a regrade you must: (1) make a **written request by email**, the request should specify which question(s) you wish to be regraded, and a rationale; and (2) **hand the exam paper in at the class meeting following the class period in which the work was returned**. Work will not be regraded after these deadlines.

## **Campus Resources for Students**

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### **Undergraduate Student Academic Success Resources:**

A list of resources for undergraduate students' academic success and information about advising can be found at [Success at Tech](#).

## 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). More resources on supporting student well-being are available through the Learning Well Initiative.

## List of Topics

This list is subject to minor changes. The final list will be provided on Canvas by the first day of classes and this syllabus will be updated accordingly.

Topic and sections	
<b>1. CONJUGATED COMPOUNDS</b>	<b>5. CARBOXYLIC ACIDS AND THEIR DERIVATIVES</b>
1.1. Conjugated Dienes: Structure and stability	5.1. Naming Carboxylic Acids and Their Derivatives
1.2. Molecular Orbital Theory	5.2. Structure And Properties Of Carboxylic Acids
1.3. Electrophilic Additions to Conjugated Dienes	5.3. Structure-Acidity Relationships
1.4. The Diels–Alder Cycloaddition Reaction	5.4. Preparing Carboxylic Acids
1.5. Ultraviolet-visible Spectroscopy and Color	5.5. Reactions of Carboxylic Acids and Their Derivatives: An Overview
<b>2. AROMATICITY</b>	5.5. Reactions of Carboxylic Acids
2.1. Naming Substituted Benzenes	5.6. Chemistry of Acid Halides
2.2. Structure of Stability of Benzene	5.5. Chemistry of Acid Anhydrides
2.3. Other Aromatic Compounds	5.6. Chemistry of Esters
2.4. Reactions at the Benzylic Position	5.7. Chemistry of Amides
2.5. Reduction of the Aromatic Moiety	5.8. Polyamides and Polyesters: Step-Growth Polymers
2.6. Spectroscopy of Aromatic Compounds	5.9. Chemistry of Nitriles
Exam 1 (topics 1 and 2)	5.10. Spectroscopy of Carboxylic Acid Derivatives
<b>3. AROMATIC SUBSTITUTION REACTIONS</b>	<b>6. AMINES AND HETEROCYCLES</b>
3.1. Introduction to Electrophilic Aromatic Substitutions	6.1. Naming amines
3.2. Halogenation	6.2. Structure and Properties of Amines
3.3. Nitration	6.3. Basicity of Amines
3.4. Sulfonation	6.4. Acylation of Amines
3.5. Friedel–Crafts Alkylation	6.5. Hofmann Elimination
3.6. Friedel–Crafts Acylation	6.6. Nitrogen Heterocycles
3.7. Activating/Deactivating Groups and Directing Effects	6.7. Spectroscopy of Amines
3.8. Synthetic Strategies	Exam 4 (topics 5 and 6)
3.9. Aryldiazonium Salts	<b>7. REACTIONS OF THE <math>\alpha</math> POSITION OF CARBONYL COMPOUNDS</b>
3.10. Nucleophilic Aromatic Substitution – #1: Add <sup>n</sup> -Elim <sup>n</sup>	7.1. Keto-enol Tautomerization
3.11. Nucleophilic Aromatic Substitution – #2: Elim <sup>n</sup> -Add <sup>n</sup>	7.2. Reactivity of Enols: $\alpha$ -substitution reactions
Exam 2 (topic 3)	7.3. Halogenation of Aldehydes and Ketones
<b>4. ALDEHYDES AND KETONES</b>	7.4 -Bromination of Carboxylic Acids
4.1. Naming Aldehydes and Ketones	7.5 Acidity of $\alpha$ -Hydrogen Atoms: Enolate formation
4.2. Synthesis of Aldehydes and Ketones	7.6. Reactivity of Enolates
4.3. Oxidations and Reduction of Carbonyl Compounds	7.7. Alkylation of Enolates
4.4. Nucleophilic Addition Reactions of Aldehydes and Ketones: Overview	7.8. Aldol Reactions
4.5. Hydride Nucleophiles: Reduction	7.9. Claisen Condensations
4.6. An Introduction to Carbon Nucleophiles	7.10. Michael Additions
<b>1. 4.7. Addition of Carbon Nucleophiles to Aldehydes and Ketones</b>	7.11 Stork Enamine Reaction
4.8. Oxygen nucleophiles	7.12. Robinson Annulation Reaction
4.9. Nitrogen nucleophiles	Exam 5 (Topic 7) and Final (comprehensive)
<b>B. 4.10. Spectroscopy of Aldehydes and Ketones</b>	
Exam 3 (topic 4)	