CHEM 4311 Syllabus

Advanced Organic Chemistry, CHEM 4311, 3 credit hours

Fall 2026

Instructor Information

Instructor: Will R. Gutekunst

Email: willgute@gatech.edu

General Course Information

Description

The goal of this course is to expand on fundamental topics in organic chemistry, with a focus on understanding a broader range of organic transformations and their corresponding mechanisms. These skills are not only valuable for deepening the understanding of literature reactions but is essential for developing new reactions and reagents. The course is divided into two major sections. The first portion is devoted to reviewing basic physical organic principles that will allow students to judge the stability of reactive intermediates and thus to evaluate the feasibility of specific reaction pathways. In the second half of the semester, these principles will be applied to the discussion of a wide range of reactions, including examples of complex organic transformation in recent literature reports. In this regard, the course fulfills a dual purpose, to review and deepen fundamental concepts already discussed in the introductory undergraduate curriculum, as well as prepare students for advanced topics in organic chemistry.

Course Learning Outcomes

By the end of this course, students will be able to:

- Develop a rational approach to understand organic reaction mechanisms
- Estimate relative thermodynamic stability of reactive intermediates
- Identify relevant orbitals involved in chemical reactions
- Correlate molecular structure and conformation to reactivity
- Propose reasonable reaction pathways for chemical reactions

Required Course Materials

"Modern Physical Organic Chemistry", by Eric V. Anslyn and Dennis A. Dougherty, University Science Books, 2006.

Grading Policy:

The grade will be assigned based on the average of three in-class exams (60% weight), the average of the take-home problem sets (15% weight), and the final exam (25% weight).

The final grade will be assigned as a letter grade according to the following scale:

A 85.0 – 100%
B 72.0 – 84.9%
C 60.0 – 71.9%
D 50.0 – 59.9%
F Less than 50.0%

Description of Graded Components

Three take-home problem sets will precede each midterm exam and will represent 15% of the total grade in the course. Collaborative work on homework assignments is permitted and encouraged, as these problems are intended to provide exam-focused practice.

All midterm and final exams are taken during the designated class/exam period and are closed to books and notes.

Course Policies

Attendance and/or Participation

Students are expected to attend at least 90% of the course sessions. Furthermore, active participation, including participation in discussions is expected. Excused absences: Students are responsible for contacting the instructor prior to the missed class session. Valid reasons for missing a class session are limited to emergencies (illness), official Georgia Tech business, and job interviews. Student must provide official documentation for all excused absences.

Academic Integrity

Students are expected to maintain the highest standards of academic integrity. All work submitted must be original and properly cited. Plagiarism, cheating, or any form of

academic dishonesty will result in immediate consequences as outlined in the university's academic honor code: https://policylibrary.gatech.edu/student-life/academic-honor-code

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.

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.