SYLLABUS

CHEM 311
Mechanistic Organic Chemistry
Fall, 2025
[redacted]

Instructor: Prof. David Zechel
Instructor Contact Information:
Chernoff Hall, Rm 413, Ph: (613) 533-3259, Email: dlzechel@chem.queensu.ca, website: zechellab.com
Office Hours: [redacted], or by appointment

TA: [redacted]
TA Contact Information: [redacted]
Tutorials: [redacted]
Office Hours: by appointment

Intended Learning Outcomes:
1. Apply models of molecular orbitals and hybridization to predict chemical properties and structures.
2. Apply models of conjugated systems and aromaticity to predicting the outcomes of pericyclic reactions.
3. Describe reactions and changes in transition state structure using single- and two-dimensional reaction coordinates.
4. Interpret reaction mechanisms based on kinetic isotope effects, solvent effects, and linear free energy relationships.
5. Predict the reactivity of non-classical carbocations and various ion pairs.
6. Rationalize the regiochemistry, stereochemistry, and reactivity of various classes of reactions.

Course Outline:
Chapters from Anslyn & Dougherty, *Modern Physical Organic Chemistry*, in parentheses.
- Structure and models of bonding (1.1)
- Thermochemistry of stable molecules and reactive intermediates (2.1)
- Hückel molecular orbital theory applied to conjugated systems (14.3)
- Pericyclic reactions (15)
- Reactivity, kinetics, and mechanisms (7.3, 7.8)
- Experiments related to thermodynamics and kinetics (8)
- Brønsted acid-base catalysis (9.3)
- Organic reaction mechanisms
    - Substitutions (11)
    - Additions / eliminations (10)

Grading Scheme:
- Tutorial Quizzes: 5%
- Problem Sets (4): 25%
- Midterm: 30%, [redacted]
- Final Exam: 40%
- If your final exam mark exceeds the midterm, its weighting will increase to 60%.

Grading Method:
All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale	
Grade	**Numerical Course Average (Range)**
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

Location and Timing of Final Examinations:
The exam dates for each Term are listed on the Faculty of Arts and Science webpage under "Important Dates." Student exam schedules for the Fall Term are posted via SOLUS immediately prior to the Thanksgiving holiday; for the Winter Term they are posted on the Friday before Reading Week, and for the Summer Term they are individually noted on the Arts and Science Online syllabi. **Students should delay finalizing any travel plans until after the examination schedule has been posted. Exams will not be moved or deferred to accommodate employment, travel/holiday plans or flight reservations.** Also, as indicated in Academic Regulation 8.3, students must write all final examination in all on-campus courses on the Kingston campus.

Academic Integrity:
Academic Integrity is constituted by the six core fundamental values of honesty, trust, fairness, respect, responsibility and courage (see www.academicintegrity.org). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities http://www.queensu.ca/secretariat/policies/senate/report-principles-and-priorities).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations/regulation-1), on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Calculator Policy:
As noted in Academic Regulation 9.2, "Calculators acceptable for use during quizzes, tests and examinations are intended to support the basic calculating functions required by most Arts and Science courses. For this purpose, the use of the **Casio 991 series calculator** is permitted and is the only approved calculator for Arts and Science students."

Accommodations for Disabilities:
Queen's University is committed to achieving full accessibility for people with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. The Senate Policy for Accommodations for Students with Disabilities was approved at Senate in November 2016 (see https://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senateandtrustees/ACADACCOMMPOLICY2016.pdf). If you are a student with a disability and think you may need academic accommodations, you are strongly encouraged to contact the Queen's Student Accessibility Services (QSAS) and register as early as possible. For more information, including important deadlines, please visit the QSAS website at: http://www.queensu.ca/studentwellness/accessibility-services/

Academic Considerations for Students in Extenuating Circumstances [*See Section 10]*

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time, not to exceed three months. Students receiving academic consideration must meet all essential requirements of a course. The Senate Policy on Academic Consideration for Students in Extenuating Circumstances was approved at Senate in April, 2017 (see http://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senate-andtrustees/Academic%20Considerations%20for%20Extenuating%20Circumstances%20Policy%20Final.pdf) Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. Arts and Science undergraduate students can find the Faculty of Arts and Science protocol and the portal where a request can be submitted at: http://www.queensu.ca/artsci/accommodations. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

If you need to request academic consideration for this course, you will be required to provide the name and email address of the instructor/coordinator. Please use the following:

Instructor Name: Prof. David Zechel
Instructor email address: dlzechel@chem.queensu.ca