CHEM 260 - REACTION MECHANISMS (2 UNITS)

COURSE OVERVIEW

SUMMARY

Chem 260 is the next course in the graduate-level series of classes in physical organic chemistry. This class dives deeper into reaction mechanisms and molecular orbital theory. A significant focus of this class is placed on understanding experimental techniques and how to design experiments for probing reaction mechanisms. This class also involves a computational project on a topic of the student's choosing which is primarily completed outside of class with the assistance of the Molecular Graphics and Computational Facility.

PREREQUISITES

Chem 12A/B or Chem 3A/B and consent of the instructor.

Must have a B or better in Chem 200.

TOPICS COVERED

- Isotope effects
- Carbocations and carbanions
- Addition-elimination and nucleophilic substition reactions
- Solvent effects
- Carbenes and nitrenes
- Radicals and diradicals
- MO theory

- Pericyclic reactions, Woodward-Hoffman rules
- Photochemistry

WORKLOAD

COURSEWORK

- Two problem sets.
- Weekly quizzes on assigned readings.
- One 3-hour midterm exam.
- One 3-hour final exam at the end of the course.

TIME COMMITMENT

Three hours of lecture per week. Occasionally (every 2-3 weeks), an optional 2-hour problem solving session on Saturday morning.

The textbook is quite dense and reading is highly recommended in order to do well in this class (1-2 hours per week for reading). Problem sets are meant to be challenging and are graded for accuracy (3-4 hours per week for problem sets). The content of this course is more challenging compared to Chem 200, as the material has less overlap with content covered in Chem 12A.

The computational chemistry project can be time-consuming depending on the choice of project. Approximately 1-2 hours per week outside of class ought to be devoted to developing the project proposal, learning how to use the software, and setting up calculations. This estimate can vary depending on the choice of project.

CHOOSING THE COURSE

WHEN TO TAKE

This class is intended to taken after Chem 200 (chem200.html).

WHAT NEXT?

There are many other graduate-level courses that are available for students who have completed this class.

ADDITIONAL COMMENTS AND TIPS

Similar to Chem 200, this class is very different from the typical undergraduate class. The focus of this class is more on problem solving and experimental design, rather than rote memorization or computation. A significant portion of lecture is set aside to solve problems in small groups and present the solution to the entire class. The topics covered in this class are deceptively simple; however, the problem sets and exams in this class are not trivial.

The computational chemistry project can also be challenging and involves a significant amount of discipline and self-directed learning.

It is also important to keep in mind that while this is a challenging class, the grading curve is quite lenient because it is a graduate-level class. Most students will receive grades in the A-B range.

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