

Chem 740: Principles of Organic Reactions

Fall Semester 2017 – Monday, Wednesday, Friday 10:00–10:50 am, Malott 2007

Instructor: Michael D. Clift

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Office Hours: Monday and Friday, 9:00–10:00 am or by appointment

Course Description and Objectives: This course will cover some of the fundamental concepts that control chemical reactivity in organic molecules. In the first portion of the course, we will discuss structure and bonding, strain and stability, non-covalent interactions, acid/base chemistry, and stereochemistry. These concepts will then be applied to the study of organic reaction mechanisms and stereoselectivity in the second portion of the course. Ultimately, students will gain an understanding of the basic principles of reactivity and learn to apply this knowledge to new and challenging problems in organic chemistry.

Prerequisites: Two semesters of undergraduate organic chemistry and one semester of undergraduate physical chemistry or concurrent enrollment.

Required Text Book: Modern Physical Organic Chemistry; University Science Books 2005; written by Eric V. Anslyn and Dennis A. Dougherty. Additional reading assignments may be provided as handouts via Blackboard.

Course Evaluation: Grades will be based on three exams and ten weekly quizzes (its likely that more than 10 quizzes will be offered, with the top 10 being used in assigning final grades). Exams and quizzes are closed book, closed notes. Molecular models and calculators can be used (no laptops or phones). Exams must be taken at the indicated time unless approval is obtained prior to the exam; make-up quizzes will not be offered.

Quizzes: Friday at the beginning of class, (50 points total, 5% of total grade)

Exam 1: Monday, October 2nd, 7:00 pm (300 points, 30% of total grade, location TBD)

Exam 2: Monday, November 13th, 7:00 pm (300 points, 30% of total grade, location TBD)

Final Exam: Wednesday, December 13th, 7:30–10:00 am (350 points, 35% of total grade)

Course Content: The course outline is shown below. Selected sections will be covered from each chapter listed. Note that this is a rough outline and the content may change in order to best meet the needs of those participating in this class.

Chapter 1: Introduction to Structure and Models of Bonding

Chapter 2: Strain and Stability

Chapter 3: Solutions and Non-covalent Binding Forces

Chapter 5: Acid/Base Chemistry

Chapter 6: Stereochemistry

Chapter 10: Organic Reaction Mechanisms, Part 1

Chapter 11: Organic Reaction Mechanisms, Part 2

Chapter 9: Catalysis (time permitting)

Chapter 4: Molecular Recognition and Supramolecular Chemistry (time permitting)