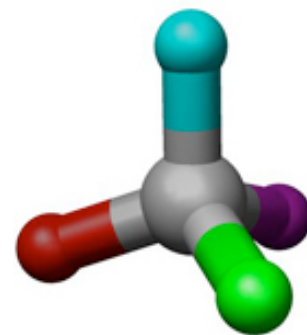


# Chemistry 742 - Physical Organic II

Syllabus - Spring 2014



**Instructor:** Prof. Gregory Cook

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**Office Hours:** by appointment

**Course Hours:** Tue, Thurs 9:00-10:50

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**Text:** A single textbook would be inadequate for a course such as this. Consequently, there is no specific required text. Instead, I will be drawing from the scientific literature and several different books for this class' material. There are a few books that you may find useful: Advanced Organic Chemistry 4th ed. Part A by F. Carey and R. Sundberg; Mechanism and Theory in Organic Chemistry by Thomas Lowry and Kathleen Schueller Richardson; Radical Chemistry by M. John Perkins; Molecular Orbital Theory of Organic Chemistry by Dewar among others. I will assume you have mastery of undergraduate organic chemistry and have a solid foundation in organic reaction mechanism.

**Introduction:** In this course we will discuss the chemistry of reactive intermediates such as free radicals and carbenes. We will cover Hückel molecular orbital theory and quantum chemistry as it pertains to organic reactions and mechanism. We will go in depth into the Woodward-Hoffmann rules for electrocyclic and pericyclic reactions. We will discuss aromaticity and electrophilic substitution. The goal of the course is to provide you with a mastery of mechanistic tools and principles to allow you to understand and predict the course of organic reactions.

**Grading:** Grading will be based on a midterm exam (30%), a final exam (50%) and a term paper (20%). Grades will be assigned as follows (subject to change):

**A** 85 - 100

**B** 75 - 84

**C** 60 - 74

**D** 45 - 59

## Course Topics:

Introduction and overview

Free Radical Chemistry / Carbenes and Nitrenes

**Midterm Exam** (tentatively Feb 6)

Hückel Molecular Orbital Theory / Frontier Molecular Orbital Theory

Woodward-Hoffmann Rules and Orbital Symmetry / Electrocyclic and Pericyclic Reactions

Aromaticity and Electrophilic Substitution

**Final Exam** (Mar 13)

**NOTE:** We will not have class on Feb 18 and 20. We will make up these days March 11 and 13.

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**Special Needs:** All students have the right to an environment that is conducive for learning. Any students who need special accommodations for learning or who have special needs are invited to share these concerns or requests with the instructor as soon as possible.

**Academic Responsibility:** It is assumed that students at NDSU have the integrity to complete work and examinations on their own. I will provide an environment that discourages temptation otherwise. Any student who is found to have acted dishonestly will receive an F for the course. The policy applied is that of the Code of Academic Responsibility and Conduct as outlined in NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (<http://www.ndsu.nodak.edu/policy/335.htm>).