CHE 262: ORGANIC CHEMISTRY LECTURE SYLLABUS

Instructor: Dr. Zachary Rodgers
Text: Organic Chemistry (Wade, 9th Ed.)
Course webpage: Desire2Learn
Prerequisites: CHE 261: C- or better
Contact Info: (724)-946-6289
Lab Time: W 2:00 – 5:00 pm or
             Th 2:00 – 5:00 pm
Class Time: MWF 8:10 – 9:10 am

Course Overview

This course builds on the chemistry covered in CHE 261: Organic Chemistry I. In contrast to CHE 261, where the fundamental principles of organic reactions are introduced, CHE 262 introduces more advanced reactions that have wider practical applications in research and industry labs. Students can expect to:

- Explore a variety of condensation reactions and their ability to rapidly construct complex molecules
- Be introduced to radical reactions and their application to produce polymers
- Study cross-coupling reactions used in a broad range of scientific fields
- Understand the stability and reactivity of aromatic compounds
- Study the emerging field of enzymes as organic catalysts
- Design multi-step syntheses to construct molecules from simpler building blocks
- Develop psychomotor skills by applying material learned in the class to hands-on laboratory work
- Make connections between material to answer complex and multi-step problems

Grading

15% In-Class and Homework Assignments
20% Laboratory Grade
45% Exams (3 Tests)
20% Final

Grading Scale
90 - 100 A               72 – 77  C
88 - 89  B+            70 – 71  C-
82 – 87  B             68 – 69  D+
80 – 81  B-            60 – 67  D
78 – 79  C+            < 60    F

The scale set in this syllabus is non-negotiable.

Laboratory Grade: See the syllabus provided for the Lab.

In Class and Homework Assignments: The book sometimes does not provide you with adequate practice for the subjects we will be covering. Therefore, we will have several in-class worksheets and online homework throughout the semester. I encourage you to work together on problems as several of them will require critical thinking to solve (two brains are better than one, yada yada). I will post online homework assignments through D2L with the due date clearly marked. These assignments are supposed to help you practice, so you are allowed to attempt them multiple times before the due date. I will take the highest score from all of your attempts to count toward your grade.

Tests: Tests will examine your deeper comprehension of the covered material. These exams may include multiple choice, short answer, mechanism schemes, and multi-step synthesis. These will be administered roughly once a month on the days indicated. Write the exam days down in your planners in super-permanent ink.

Final: This is structured as a slightly longer exam and will cover all of the topics touched on in Organic Chemistry 2.
**ACS Final:** This is a 70 question, comprehensive final for all of Organic Chemistry (semesters 1 and 2) provided by the ACS. It is multiple choice, but its final grade is not weighted on a % of total questions answered correctly. For example, a 55/70 is approximately a 95%. If you do better on this test than a previous exam, your lowest exam grade can be replaced with this grade. This **INCLUDES THE FINAL.**

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**Additional Resources**

**Online Resources:** I will post additional resource material, such as mechanism videos, molecular models, and practice problems, on the course Desire2Learn website for you to review. I encourage all of you to suggest problems that you are struggling with so that I may tailor these resources for class needs.

**Office Hours:** I am a firm believer in extensive office hours to help you succeed. I will provide the normally scheduled times for the office hours at the start of the semester. However, I am also available for office hours by email appointment provided you allow for several days notice. Please bring specific questions or concerns to make these sessions more productive. Also, try to come as small groups of students (3-4), so that I may help as many of you at once as possible. As Dr. Wilson has his own class, please be considerate of his students’ time and do not use his office hours for yourself. If you cannot make my office hours, please email me so we can work out a time.

My office is located in Hoyt Science Center Office 366.

My office hours are as follows:

- Wednesday 9:10 – 11:00 am
- Thursday 1:00 – 2:00 pm
- Friday 12:00 – 2:00 pm

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**Tips to Succeed**

**Read, read, READ:** Course quizzes will use main topics contained in the assigned reading, so you must read prior to class to do well on these assessments. I would also encourage you to take notes as you read, since I will allow these notes to be used during quizzes. Additionally, these sections will prepare you for the day’s lecture so that you can absorb more of the information and gain a deeper understanding of the material.

**Join a study group:** If you wish, I will help you find other students to study with. Making friends while aiding each other in learning will make the class more enjoyable and improve your collaboration skills.

**Practice and test your knowledge several times a week using the suggested problems:** Organic chemistry is a difficult subject, because of the pure volume of material. Therefore, cramming will not help you on tests. Set aside time each week (~3-4 hours) to practice and stay ahead of the material. **Be sure to do at least the problems in the suggested reading sections.** If you do this, you will be able to quickly adapt to new material and have to devote less time (and loss of sleep) to studying during test week.

**Utilize the online resources and office hours:** During your study time each week, be sure to check out the online material for additional videos or problems. These will give you more practice and help you review material you may have missed in class. Also, do not hesitate to come to office hours with specific question or concepts you have struggled with.
CHEM 262 Lecture Schedule with Suggested Readings from the Book

*** Denotes a flipped lecture day. Look on Desire2Learn for an intro lecture or reading assignment.

**Jan. 14:** Review: Reactions of Carbonyls- Oxidation and Reductions

Suggested Reading: Section 13-12 (pg. 696-700), Section 7-7 (pg. 326-330, 945), Section 8-5 (pg. 384-392), and Section 8-8 (pg. 404-410)

**Jan. 16:** Review: Reactions of Carbonyls- Acyl Substitution and Addition

Suggested Reading: Section 7-2 to 7-6 (pg. 303-325) and Section 8-1 to 8-4 (pg. 360-384)

**Jan. 18:** Reactions of Carbonyls- Grignards

Suggested Reading: Section 7-8 to 7-9 (pg. 330-341) and

**Jan. 23:** Reactions of Carbonyls- Grignards and Intro to Enolate Formation/Behavior***

Suggested Reading: Sections 19-1 to 19-2 (pg. 998-1003)

**Jan. 25:** Enols and Enolates: Alkylation and Halogenation

Suggested Reading: Sections 19-3 to 19-7 (pages 1003-1028)

**Jan. 28:** Enols and Enolates: Aldol Condensation

Suggested Reading: Sections 20-1 to 20-2 (pages 1047-1054)

**Jan. 30:** Enols and Enolates: Cross Aldols***

Suggested Reading: Sections 20-3 to 20-4 (pages 1055-1061)

Suggested Problems: Enolate Worksheet (Part 1)

**Feb 1:** Enols and Enolates: Claisen and Cross-Claisen Condensations

Suggested Reading: Sections 20-5 (pages 1061-1068)

**Feb 4:** Enols and Enolates: Claisen and Cross-Claisen Condensations

Suggested Reading: Sections 20-6 (pages 1068 to 1069)

Suggested Problems: Enolate Worksheet (Part 2)

**Feb 6:** Enols and Enolates: Michael Additions***

Suggested Reading: Sections 20-7 to 20-9 (pages 1069-1082)

**Feb 8:** Enols and Enolates: Wittig Reaction and Its Variations

Suggested Reading: Sections 7-10 (pages 341-447)

Suggested Problems: Enolate Worksheet (Part 3)

**Feb 11:** Catch-up and Review Day

**Feb 13:** Exam One

**Feb 15:** Review: Electrophilic Addition

Suggested Reading: Sections 14-1 to 14-5 (pages 713-732)

**Feb 18:** Review: Electrophilic Addition

Suggested Reading: Sections 14-6 to 14-10 (pages 732-754)

**Feb 20:** Reactions of Benzene: Aromaticity***

Suggested Reading: Chapter 17 (pages 868-901)

**Feb 22:** Reactions of Benzene: Electrophilic Aromatic Substitution Mechanism And Regioselectivity

Suggested Reading: Sections 18-1 (pages 914-917)
Feb 25: Reactions of Benzene: Halogenation, Nitration, Sulfonation  
*Suggested Reading*: Sections 18-2 to 18-3 (pages 917-924)

Feb 27: Reactions of Benzene: Friedel Crafts Alkylation and Acylation  
*Suggested Reading*: Sections 18-4 to 18-11 (pages 924-963)

Mar 1: Reactions of Benzene: 
SNAr and the Benzyne Mechanisms***  
*Suggested Reading*: Sections 18-12 to 18-13 (pages 963-969)

Mar 4: Reactions of Benzene: Putting it together to Make Complex Aromatics  
*Suggested Reading*: Sections 18-14 (pages 969-974)

Mar 6: Catch-up and Review Day

Mar 8: Exam Two

Mar 9 – Mar 17: SPRING BREAK

Mar 18: Radicals: Halogenation***  
*Suggested Reading*: Sections 21-1 to 21-2 (pages 1093-1102)

Mar 20: Radicals: Halogenation (cont.)  
*Suggested Reading*: Sections 21-3 to 21-4 (pages 1102-1107)

Mar 22: Radicals: Anti-Markovnikov Halogenation  
*Suggested Reading*: Sections 21-5 (pages 1107-1112)

Mar 25: Radicals: Polymerization of Alkenes  
*Suggested Reading*: Sections 22-3 (pages 1143-1156)

Mar 27: Cross-Coupling: General Idea and Transmetallation***

Mar 29: Cross-Coupling: Gillman and Stille

Apr 1: Cross-Coupling: Suzuki and Heck

Apr 3: Synthesis of Cross-Coupling Intermediates

Apr 5: Pericyclic Reactions: Introduction to Conjugated Pi Systems***

Apr 8: Pericyclic Reactions: The Diels Alder  
*Suggested Reading*: Sections 16-2 (pages 816-823), Sections 16-6 (pages 837-847)

Apr 10: Pericyclic Reactions: Inverse Demand Diels Alder and Huisgen’s Cycloaddition

Apr 12: Pericyclic Reactions: The “Forbidden” [2+2] and Alkene Metathesis  
*Suggested Reading*: Section 16-7 (pages 847-854)

Apr 15: Catch-up and Review Day

April 17: Exam Three

Apr. 23: Special Topics and Problem-Solving: Putting the Intro to Organic Chemistry Together***

Apr. 26: Special Topics and Problem-Solving: Putting the Intro to Organic Chemistry Together
Apr 29: Final Exam Review
May 1: ACS EXAM DAY
May 3: Final Exam Review
May 7: FINAL