

Chemistry 2320
Organic Chemistry II, Spring 2008

- Instructor:** Dr. Bradley S. Davidson
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- Meeting Time/Place:** MWF 10:30 – 11:20 am, ENGR 103; R 3:30 – 4:20 pm, ENGR 103
- Office Hours:** MWF, 9:00 – 10:00 am; T, 1:30 – 2:30; or by appointment
- Course Web Pages:** Blackboard Vista: online.uen.org/webct/entryPage.dowebct
- Materials:** Text – “Organic Chemistry” Custom Edition for USU (or 5th Ed), Paula Bruice, Prentice Hall (2007).
Study Guide and Solutions Manual by Bruice.
Model Kit – Available in Chem Stores (1st floor of Widtsoe). (recommended)
- Course Description:** The second of a two-semester sequence, covering structures, physical properties, nomenclature, mechanisms of reactions, and biological relevance of organic and bioorganic molecules.

General Learning Objectives for 2320:

Organic chemistry is a cumulative subject; therefore, you will be required to continue demonstrating your knowledge and understanding of the topics covered in Chem 2310. In addition, you will need to:

- Understand what structural properties are probed by mass spectrometry, infrared spectroscopy, and ultraviolet spectroscopy, and be able to use spectral data to identify the structures of organic molecules.
- Understand the structural properties probed using nuclear magnetic resonance spectroscopy, such as the interactions between nuclei, magnetic fields, and radiofrequency radiation, and be able to interpret proton and carbon NMR spectra to identify the structures of organic molecules.
- Be able to identify aromatic and antiaromatic compounds and appreciate the chemical consequences of aromaticity; be able to write the mechanisms for and predict the products of electrophilic aromatic substitution reactions.
- Be able to explain and to predict the effects of substituents on the reactivity and regiochemistry of electrophilic aromatic substitution reactions.
- Know the structures and chemical properties of carboxylic acid derivatives; be able to write the mechanisms for nucleophilic substitution and hydrolysis reactions of such compounds, and to predict the products of such reactions.
- Be able to write mechanisms for nucleophilic addition reactions and for addition-elimination reactions of aldehydes and ketones, and be able to predict the products of such reactions.
- Understand the reason for and the consequences of the acidity of protons alpha to carbonyl groups, be able to write mechanisms for the reactions of enolate anions, and predict the products of such reactions.
- Be able to identify the various forms of catalysis (including nucleophilic, general acid/base, specific acid/base, anchimeric assistance, metal-ion catalysis) and be able to write mechanisms for such processes.
- Be able to describe the general structure of a carbohydrate, and the major reactions of carbohydrates.

- Be able to write the structure of an amino acid, and explain how amino acids form proteins and their overall chemical structure and reactivity.
- Know the general structures of lipids and fatty acids and their chemical and physical properties.
- Know the structures of nucleosides, nucleotides and nucleic acids, and the physical and chemical properties of related biological molecules.

***Detailed learning objectives for each chapter are available on the Blackboard site.

Tentative Course Outline and Exam Schedule:

Week	Dates	Quiz	Chapter(s)
one	1/7 – 1/11	Pre	Introduction, Chapter 12
two	1/14 – 1/18	1	Chapters 12
three	1/23 – 1/25 (1/21 no class)	2	Chapter 13
four	1/28 – 2/1		Chapter 13, Exam 1 (2/1)
five	2/4 – 2/8	3	Chapters 14
six	2/11 – 2/15	4	Chapter 15
seven	2/19 – 2/22 (2/18 no class)	5	Chapter 16
eight	2/25 – 2/29		Chapter 16, Exam 2 (2/29)
nine	3/3 – 3/7	6	Chapter 17
ten	3/10 – 3/14		Spring Break
eleven	3/17 – 3/21	8	Chapter 17, Chapter 18
twelve	3/24 – 3/28		Chapter 18
thirteen	3/31 – 4/4	9	Chapters 19, Exam 3 (4/4)
fourteen	4/7 – 4/11	10	Chapter 20, Chapter 21
fifteen	4/14 – 4/18		Chapter 22, Chapter 26
sixteen	4/21 – 4/25	11	Chapter 26, Review
seventeen	4/30 (Wed)		Final Exam (9:30 – 11:20 am)

Assessment:

Assessment involves measuring student progress as well as teaching effectiveness. The following assessment strategies have been incorporated into this course.

- A pre-test/post-test approach will be used to measure comprehension and teaching of important concepts. The pre-test will be administered through Blackboard and must be taken on your own time. The ten multiple choice questions of the pre-test will reappear in the final, in slightly altered form, to assess teaching and learning progress during the semester. If weaknesses are observed in specific subject areas, teaching methods will be reevaluated. Although no formal points will be awarded, you must take the pre-test before you will be permitted to take course quizzes.
- Student evaluations will be used to evaluate course/instructor strengths and weaknesses. In addition to the standard end-of-course evaluation, a midterm questionnaire will be circulated to assess teaching/learning strategies. Constructive suggestions are welcome anytime.

Online links to chemistry materials:

The Bruice textbook website (needs access code) has tutorials, excersizes, quizzes, and a molecular gallery.

www.prenhall.com/bruice/details.html

Jones and Bartlett Publishers' organic chemistry site, which has files of molecular structures, animations of chemical mechanisms, and much more:

www.jbpub.com/organic-online/webhome.htm

A site with self-tests, message boards, and other helpful organic chemistry study aids:

www.chemhelper.com

Los Alamos Periodic Table Site:

pearl1.lanl.gov/periodic

Expansive lists of links for organic chemists:

www.ux1.eiu.edu/~cfthb/links/research
www.organicworldwide.net

Grading Scheme:

Point Distribution: Best two out of three one-hour exams (2x100 pts)
Best ten out of eleven Blackboard quizzes (10x10 pts)
Comprehensive Final (200 pts)
Total Points: 500 pts

Grade Breakdown:

The grade received in the course is based on your performance on the exams, quizzes, and homework. Grades are guaranteed as given below for overall percentage score on all exams. Actual grade ranges may be curved somewhat lower, depending on the overall class average.

A, A-	89% or higher
B+, B, B-	78% or higher
C+, C, C-	66% or higher
D+, D	53% or higher

Procedures:

1. The format of the exams is a combination of multiple choice (30%) and fill-in (70%), where you will be expected to draw chemical structures and explain you answers. The exams are meant to test your *understanding* of the topics covered in lecture, not your ability to repeat memorized problems. Expect some questions that require you to *apply* your understanding to new problems. Practice problems and past exams will be available on the Blackboard Vista site for download. They will provide the best examples of the fill-in questions.
2. There will be no make-up exams. It is possible to take an exam in advance, but only with a valid excuse and prearrangement with me. If you miss an exam without prearrangement, then that will be the exam dropped from your overall score.
3. Addition mistakes or questions over exam grading should be discussed with me within one week following the return of the exam. No point adjustments will be made after this time.
4. Quizzes will be offered through Blackboard Vista and must be taken on your own time. Each quiz will be available from Monday, 10:30 am (MST), until the following Monday, 10:30 am. They will consist of ten multiple-choice questions, chosen randomly from a bank of questions. They will be open-book, with a time limit of 30 minutes, and can be taken as many times as you

want, with your highest score being recorded. You will benefit the most from the quizzes if you prepare and try to take them without help from the book or your notes. You have an entire week, 24/7 to take the quizzes. **Do not ask for an extension.**

5. Each non-test week, a "molecule of the week" will be chosen from the American Chemical Society web site. An extra credit question pertaining to the "molecules of the week" worth 5 pt will be offered on each midterm exam.
6. All answer keys, practice tests, lists of assigned problems, etc. will be posted on the course Blackboard Vista site. Answer keys and practice tests will be available in pdf format, which will require you to have Adobe Acrobat Reader on your computer. This can be downloaded free at www.adobe.com/products/acrobat/readstep2.html.
7. It is official University policy that unless you have three exams on the same day, you must take the final exam in this course at the officially scheduled time. Permission to take a final at any other time for any other reason can only be obtained from the Dean of Science.
8. The University add/drop policies are described in the Fall Schedule of Classes. Between January 12th and 28th courses can be added only with the instructor's signature. The last day to add is January 28th. A student may drop a class without any notation on the transcript until January 28th. Between January 28th and March 7th, any drop receives a permanent "W" notation on the transcript. Between March 8th and April 1st, the advisor (not the Dean's Office) must approve of a drop. In addition, the "W" is accompanied by the grade in the class at the time of the drop. Finally, after April 1st, a student may drop a class only with "extenuating circumstances." The University policy on giving a grade of Incomplete will be strictly followed. See the section on Academic Policies in the Fall Semester Schedule of Classes guide, pages 104 – 107, for current policies, or follow this link to the Provost's office.
9. The main function of office hours is to discuss and solve problems that you may be having with the course materials, assigned problems, and concepts presented during lecture. Try to formulate questions in advance. Do not expect a mini review session.
10. All individuals are responsible for understanding the contents of this document.
11. Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation with the program.

Suggestions:

1. Try not to simply memorize. You will be more successful if you strive to understand the underlying principles.
2. Organize your reactions. Categorize them by reacting functional group, reagent, and product functional group. Look for similarities in mechanism.
3. Make up flash cards with reagents on one side and products on the other and with organic and inorganic reagent on one side and organic reagent and product on the other. Drill yourself.
4. Keep up with lecture and reading materials.
5. Make sure to take the quizzes and do the on-line homework problems! In addition to helping your overall comprehension and exam performance, do not miss easy-to-obtain points.
6. Work the problems! Work the problems! Work the problems! (practice makes perfect)
7. Use the web sites listed above.
8. Study in groups, but make sure everyone contributes.
9. Use molecular models and/or the textbook website to visualize the three-dimensional nature of organic molecules.