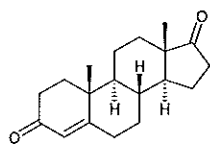


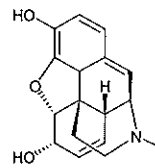
Strychnine
(poison)



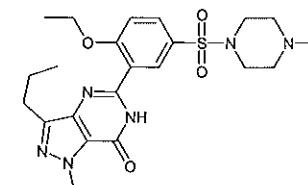
Androstenedione
(estrogen and testosterone
precursor)

Organic Chemistry Chemistry 143

Fall 2008



Morphine
(opiate analgesic
drug)



Viagra
(vasodilation by
inhibition of PDE5)

Instructor: Matthias Brewer 6-1042 Cook A335 Matthias.Brewer@uvm.edu

Lecture: 10:10am – 11:00am MWF, Angell B203

Text:

Organic Chemistry 9th ed., Solomons & Fryhle, Wiley, 2007 (ISBN: 978-0-471-68496-1)

Organic Chemistry Study Guide and Solutions Manual 9th ed., Solomons, Fryhle & Johnson, Wiley, 2007 (ISBN: 978-0-470-05098-9)

Molecular Models: Molecular Structure Models (e.g.: ISBN: 0471-362719)

Books in library that may also be useful:

The Art of Writing Reasonable Organic Reaction Mechanisms R.B. Grossman ISBN:0-387-95468-6

Writing Reaction Mechanisms in Organic Chemistry A. Miller ISBN: 0-12-496711-6

Course Prerequisite: Chemistry 32 or 36.

Office hours:

Mon 11:00-12:00

Wed 4:00-5:00

or by appointment

This course will address learning goals 1,2,3, and 5 below for chemistry majors:

1. Students will demonstrate general knowledge in chemistry and will be able to apply chemical and physical principles in the solution of qualitative and quantitative chemical problems.
2. Students will understand the interplay of observational data, hypotheses, and hypothesis-driven experimentation through application of the scientific method.
3. Students will become proficient in chemical laboratory techniques and be able to apply these to practical and current problems in research.
4. Students will be able to read and critically evaluate the chemical and scientific literature.
5. The students will learn to present scientific data clearly and effectively through both written and verbal communication.

General Comments

In Chemistry 143 we begin an exploration of the basic principles of Organic Chemistry. You will find that Organic Chemistry involves many new concepts, a large number of rules and formal relationships and a very large number of reaction mechanisms. However, as the course progresses and your organic “repertoire” grows, you will also find that a relatively small subset of rules serves to tie together the vast

amount of information contained in the text. A special effort made at the beginning of the course to master the writing of proper Lewis structures with the correct number of bonds, formal charges, and unshared pairs of electrons will pay off handsomely as the course progresses. Also, an early and thorough understanding of the relative electronegativity of atoms, Lewis acid-base theory, Bronstead-Lowry acid-base theory, and the rules for writing proper contributing "structures" to resonance hybrids will make the understanding of reaction mechanisms considerably easier.

For each chapter you should work as many of the suggested problems as possible. I strongly urge you to keep up with your reading and problem solving. The study of Organic Chemistry is a highly structured cumulative intellectual enterprise. Cramming does not work well in this subject!

Academic Conduct: Cheating will be considered grounds for failing the course. All graded assignments must be your own work. Cases of cheating or plagiarism *will* lead to further disciplinary action which may include dismissal from the University according to the rules set forth in The University of Vermont's *Code of Academic Integrity*.

Grading: Your course grade will be based on ten quizzes, three examinations, a cumulative final examination, and your laboratory grade. (**Note:** You must earn a passing grade in the laboratory to receive a passing grade for the course. More than two laboratories missed for any reason will result in a failing grade for the course (unless you are granted an incomplete by your dean).

Lab	20%...200pts	(Check in will be 9/9 and 9/11)
Quizzes	15%...150pts	
Exam 1	15%...150pts	
Exam 2	15%...150pts	
Exam 3	15%...150pts	
Cumulative Final	20%...200pts	

Midterm Dates:

[Review sessions will be held the Monday before the exam: Angell B-203 6:00-8:00pm]

Wednesday, October 1	6:00 P.M.-8:00 P.M.	Kalkin 002
Wednesday, October 22	6:00 P.M.-8:00 P.M.	Kalkin 002
Wednesday, November 12	6:00 P.M.-8:00 P.M.	Kalkin 002

Final Exam Date:

Friday, Dec 12th	8:00 A.M.-11:00 A.M.	Angell B-203
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Quiz Dates:

1. September 5	6. October 17
2. September 12	7. October 31
3. September 19	8. November 7
4. September 26	9. November 21
5. October 10	10. December 5

No exam grades are dropped. The only valid excuses for missing an exam are medical or other true emergency situations. If you miss an exam for such a reason, you must inform me of it promptly, present appropriate documentation of your excuse, and

receive formal approval to take a make up exam. If you miss an exam for any other reason, you will receive a grade of zero for that exam. The answers to exam problems will be posted after each exam. If you have any questions concerning the grading of an exam, you must see me within one week after the day the exam is returned to the class. Exams must be taken in ink to insure that you can get points for a grading error.

The lowest quiz score will be dropped and will be replaced by the average score of the nine remaining quizzes.

Religious Holidays: Students have the right to practice the religion of their choice. Each semester students should submit in writing to their instructors by the end of the second full week of classes their documented religious holiday schedule for the semester. Faculty must permit students who miss work for the purpose of religious observance to make up this work.

Tentative Outline of Course

Chapter 1. Carbon Compounds and Chemical Bonds.

Sections 1.1-1.8, 1.11-1.14, 1.16-1.17

Suggested Problems: 1.1-1.6, 1.8-1.16, 1.18-1.33

Chapter 2. Representative Carbon Compounds.

Sections 2.1-2.15

Suggested Problems: 2.1-2.3, 2.5-2.15, 2.17, 2.20-2.28, 2.32, 2.33, 2.36, 2.37, 2.41, 2.42

Chapter 4. Alkanes.

Sections 4.1-4.6 4.8-4.18

Suggested Problems: 4.1-4.18, 4.22-4.26, 4.28-4.30, 4.33-4.36, 4.38, 4.41, 4.44-4.47a,b

Chapter 5. Stereochemistry.

Sections 5.1-5.15

Suggested Problems: 5.2-5.5, 5.8-5.14, 5.16-5.20, 5.23-5.27, 5.30-5.35, 5.37-5.39(a-e)

Chapter 3. Intro to Organic Reactions.

Sections 3.2, 3.4-3.7, 3.9-3.12, 3.14

Suggested Problems: 3.1, 3.2, 3.3, 3.5, 3.7-3.9, 3.11, 3.13-3.20, 3.22, 3.25, 3.28, 3.29, 3.31, 3.36

Chapter 6. Ionic Reactions.

All Sections

Suggested Problems: 6.1-6.16, 6.17(c-k), 6.18-6.22, 6.26, 6.27, 6.32, 6.33, 6.39

Chapter 7. Alkenes and Alkynes I. Synthesis.

All Sections

Suggested Problems: 7.5-7.11, 7.13, 7.15, 7.16-7.18, 7.22, 7.24-7.27, 7.31-7.35, 7.37, 7.38, 7.40, 7.43, 7.44, 7.47

Chapter 8. Alkenes and Alkynes II. Addition Reactions.

All Sections

Suggested Problems: 8.1-8.21, 8.22-8.27, 8.32, 8.33, 8.36, 8.39

Chapter 10. Radical Reactions.

All Sections

Suggested Problems: 10.2, 10.4, 10.12, 10.13, 10.14, 10.16, 10.17, 10.19-10.23, 10.25, 10.28

Chapter 11. Alcohols and Ethers.

All Sections

Suggested Problems: 11.4-11.8, 11.10, 11.14, 11.15, 11.17, 11.20, 11.21, 11.23, 11.25-11.28, 11.33-11.35, 11.36, 11.38-11.40, 11.42, 11.46

Chapter 12. Alcohols from Carbonyl Compounds.

All Sections

Suggested Problems: 12.4, 12.5, 12.8-12.20, 12.21

Chapter 13. Conjugated Unsaturated Systems.

All Sections

Suggested Problems: 13.1-13.5, 13.8-13.16, 13.18, 13.19, 13.24

Concepts you must understand from General Chemistry:

- Properties of covalent bonds
- The octet rule
- Structural isomers
- Lewis dot structures
- Formal charges
- Resonance
- Electronegativity and bond polarity
- VSEPR (Valence Shell Electron Pair Repulsion)
- Hybridization

Key's to success in Organic Chemistry:

- Do not try to cram!
- You will see many new concepts in this course. Try to write out an explanation of the concepts in your own words as if explaining them to someone else.
- Work as many practice problems as possible. Practice problems reinforce the new concepts and are the only way to test your understanding of the material.
- Do not look at a problem's answer until you have really tried the problem. After seeing the answer it often seems obvious and you may assume you understand.
- When you get a problem wrong, try to understand where your thinking was in error and attempt to identify what concept you missed.
- Ask questions!
- Come to office hours or make an appointment with me to resolve any questions early!
- Review the material frequently.