

CHEMISTRY 262, WINTER 2003

Organic Chemistry II

Instructor: Professor Alexei V. Demchenko

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Lecture: MW, 11:00 AM - 12:15 PM; B445 Benton Hall

Office Hours: TR, 3:00-4:30 PM

Textbook/Supplies: The same material as for Chem 261 (Organic Chemistry I): P. Y. Bruice “Organic Chemistry”, 3rd Edition, Prentice Hall, 2001; *Study Guide and Solution Manual as well as a set of Molecular Models are recommended* (discounted package is also available at the University Book Store). Molecular models may be used during examinations.

Credit: 3.0

Prerequisite: Chemistry 261 (Organic Chemistry I)

Course Ref#: 14740

CHEMISTRY 262 is the lecture course that continues your exciting journey to the world of organic chemistry, the chemistry of living tissue, the science that covers multiple aspects of modern synthetic, medicinal, pharmaceutical, bio-, and computational chemistry. It is to be expected that you are already familiar with major introductory aspects of the subject: structure, nomenclature and basic reactions and mechanisms of simple organic molecules. Chem 262 expands your knowledge for more specific objects. Thus, you will study reactions of aromatic and carbonyl-containing molecules, major biologically important molecules and physico-chemical methods for the analysis of organic compounds. It appears that complex organic molecules (carbohydrates, proteins, nucleic acids) are involved in most cell functions: they give shape to cells and therefore organs, they identify cells by providing unique chemicals (antigens) on cell surfaces. Natural compounds act both as receptors for signals from outside the cell and as signals, they also provide the energy reserves and currency of cells. As these processes are understood and mastered, and the structures of complex biomolecules are elucidated, some diseases will be conquered and clinical therapies invented or improved (examples: outer shell of the AIDS virus is covered with glycoproteins, many types of tumor cells produce unusual carbohydrate sequences, skin disorders, various infections *etc., etc., etc.*).

During the lecture course you will not only learn important tools that allow chemists to synthesize, modify and analyze organic molecules, but also design the state of the art multi-step syntheses. Some of you might decide to continue with your studies, take more advanced courses, enter the graduate program, and maybe one day join the research and development division of a world leading pharmaceutical company. And who knows, YOU might be a part of the team to discover new cures for the 21st century lethal diseases...

All students are expected to attend lectures without exception. If you miss a lecture for any reason, make sure that you obtain notes from others. Some problems from the textbook will be addressed during the course; it is also expected that you will go through the problems as your homework. The more problems you work out, the more confident you will be with the subject and the more prepared you will be for the exams. Additional computer-graded problems for each chapter can be found at the ‘Companion Website’ (<http://www.prenhall.com/bruice/>).

Good luck with your studies!

Syllabus - CHEMISTRY 262, WINTER 2003

(subject to modification)

- Introduction January 13 (Lecture #1)
Introduction to the course: requirements, expectations, guidelines, etc.
- Chapter 12. January 15, 22 (Lecture #2, 3)
Mass Spectrometry, IR Spectroscopy, and UV Spectroscopy.
Problems: _____
- Chapter 13. January 27, 29, February 3 (Lecture #4-6)
Introduction to the NMR Spectroscopy
Problems: _____
- Chapters 12, 13 Overview. February 5 (Lecture #7)

Chapters 12-13. EXAM I, Monday, February 10, 2003

- Chapter 14. February 12, 17 (Lecture # 8, 9)
Aromaticity. Reactions of Benzene.
Problems: _____
- Chapter 15. February 19, 24 (Lecture # 10, 11)
Reactions of Substituted Benzenes.
Problems: _____
- Chapters 14, 15 Overview. February 26 (Lecture # 12)

Chapters 12-15. EXAM II, Monday, March 3, 2003

- Chapter 16. March 5, 10 (Lecture # 13, 14)
Carbonyl Compounds I: Reactions of Carboxylic Acids.
Problems: _____
- Chapter 17. March 12, 17 (Lecture # 15, 16)
Carbonyl Compounds II: Reactions of Aldehydes and Ketones.
Problems: _____
- Chapter 18. March 19, 31 (Lecture # 17, 18)
More about Oxidation-Reduction Reactions.
Problems: _____
- Chapter 19. April 2, 7 (Lecture # 19, 20)
Carbonyl Compounds III: Reactions at the α -Carbon.
Problems: _____
- Chapters 16-19 Overview, April 9 (Lecture # 21)

Chapters 16-19. EXAM III, Monday, April 14, 2003

- Chapter 20. April 16, 21 (Lecture # 22, 23)
Carbohydrates.
Problems: _____
- Chapter 21. April 23, 28 (Lecture # 24, 25)
Amino Acids, Peptides, and Proteins.
Problems: _____
- Chapter 25. April 30, May 5 (Lecture # 26, 27)
Nucleosides, Nucleotides, and Nucleic Acids.
Problems: _____

Chapters 12-21, 25. FINAL EXAM, Monday, May 12, 2003, 10:00-12 Noon