

CHEMISTRY 2633, FALL 2003

Organic Chemistry Laboratory

Instructor: Professor Alexei V. Demchenko

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Lecture:	W, 5:30-6:20 PM; B242 (Benton Hall)
Laboratory:	W, 6:30 – 11:00 PM; B401 (Benton Hall)
Office Hours:	The instructor and teaching assistant will be available during normal laboratory hours
Textbook/Supplies:	<i>Required:</i> Laboratory Manual for Techniques of Organic Chemistry Organic Chemistry Laboratory Notebook Protective goggles/Safety glasses <i>Recommended</i> Labcoat These items are available in the University Bookstore (MSC)
Credit:	2.0
Prerequisite:	Chemistry 2612 (Organic Chemistry I)
Course Ref#:	34730

CHEMISTRY 2633 is the laboratory 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 2633 teaches you to apply your knowledge on practice. In addition, you will study some reactions of aromatic and carbonyl-containing molecules, topics covered by 2622 lecture course. You are already acquainted with general techniques employed in the laboratory, such as weighing, measuring volumes, preparing solutions, determining temperatures, etc. During the laboratory course you will expand your knowledge by learning important tools that allow chemists to synthesize, modify and analyze organic molecules. I can assure you that by the end of this course you will be confident enough to perform the state of the art multi-step syntheses!

Natural organic molecules 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. Many modern therapeutics are based on complex organic molecules, synthesis of which would not be possible without basic techniques you are to master during this semester. You would be surprised to learn how many of the basic techniques are used by researchers at the universities and pharmaceutical companies on a daily basis! 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 lecture/laboratory sections 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.

Good luck with your studies!

Syllabus - CHEMISTRY 2633, FALL 2003

(subject to modification)

<u>Introduction</u>	August 20 (Week #1) <i>Introduction to the course: requirements, expectations, guidelines, basic techniques, safety, notebook, major equipment, laboratory check-in</i>
<u>Experiment 1.</u>	August 27 (Week #2) <i>Synthesis of Aspirin. Crystallization, Filtration. Melting Point Determination</i>
<u>Experiment 2.</u>	September 3 (Week #3) <i>Synthesis of Acetaminophen. Decolorization.</i>
<u>Experiment 3.</u>	September 10 (Week #4) <i>Caffeine Experiment. Extraction, Washing, Sublimation.</i>
<u>Experiment 4.</u>	September 17 (Week #5) <i>Thin Layer Chromatography (TLC). Exp's 1 and 2 are due.</i>
<u>Experiment X*.</u>	September 24 (Week #6) <i>Synthesis of Methyl 1,6-O-Benzylidene-α-D-glucopyranoside.</i>
<u>Experiment 6.</u>	October 1 (Week #7) <i>Fractional and Simple Distillation of a Binary Mixture. Gas Chromatography. Exp's 3 and 4 are due.</i>
<u>Experiment 7.</u>	October 8 (Week #8) <i>Isolation of a Natural Product by Steam Distillation.</i>
<u>Midterm Exam</u>	October 15 (Week #9) <i>Catch-up with all unfinished experiments</i>
<u>Experiment 9.</u>	October 22 (Week #10) <i>Identification of Unknowns. Solubility, Functional Groups, Reports. Infra Red Spectroscopy (IR, FTIR). Exp's X, 6 and 7 are due.</i>
<u>Experiment 9,10.</u>	October 29 (Week #11) <i>Identification of Unknowns (continued). Synthesis of Benzoin</i>
<u>Experiment 10.</u>	November 5 (Week #12) <i>Multistep Synthesis. Oxidation of Benzoin to Benzil.</i>
<u>Experiment 10.</u>	November 12 (Week #13) <i>Multistep Synthesis. Reactions of Benzil.</i>
<u>Experiment 5</u>	November 19 (Week #14) <i>Synthesis of Isopentyl Acetate (Banana Oil).</i>
<u>Final Exam</u>	December 3 (Week #15) Exp's 5, 9 and 10 are due. Laboratory check out

* - reading assignment and laboratory instructions for exp. X will be provided

Evaluation/Grades

Your final grade will be based on your accumulated point total on 800 point scale in the following areas:

- 1 Notebook grades (250)
- 2 Grades on yields and unknowns (250)
- 3 Examinations (200)
- 4 Laboratory performance (100)