

CHEMISTRY 2633, FALL 2007

Organic Chemistry Laboratory

Instructor: Professor Alexei V. Demchenko

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**Teaching Assistants: Ms. Sneha Ranade (Tuesday)
Ms. Hemali Premathilake (Wednesday)**

Lecture: W, 11:30 AM - 12:20 PM; B240 (Benton Hall)
Laboratory: T, 12:30 – 5:00 PM; B401 (Benton Hall)
W, 12:30 – 5:00 PM; B401 (Benton Hall)
Office Hours: The instructor and teaching assistants will be available during normal laboratory hours
Textbook/Supplies: *Required:* Laboratory Manual for Techniques of Organic Chemistry
(dark blue cover for Fall 2007, day sections only)
Organic Chemistry Laboratory Notebook
Protective goggles/Safety glasses
Recommended Labcoat
These items are available in the University Bookstore (MSC)

Credit: 2.0
Prerequisite: Chemistry 2612 (Organic Chemistry I)
Course Ref#: 42278 (Tuesday), 42276 (Wednesday)

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 2007

(subject to modification)

- Introduction August 21/22 (Week #1)
Introduction to the course: requirements, expectations, guidelines, basic techniques, safety, notebook, major equipment, laboratory check-in
- Experiment 1. August 28/29 (Week #2)
Synthesis of Aspirin. Crystallization, Filtration. Melting Point Determination
- Experiment 2. September 4/5 (Week #3)
Synthesis of Acetaminophen. Decolorization.
- Experiment 3. September 11/12 (Week #4)
Caffeine Experiment. Extraction, Washing, Sublimation.
- Experiment 4. September 18/19 (Week #5)
Thin Layer Chromatography (TLC).
Exp's 1 and 2 are due.
- Experiment 5. September 25/26 (Week #6)
Synthesis of Isopentyl Acetate (Banana Oil).
- Experiment 6. October 2/3 (Week #7)
Fractional and Simple Distillation of a Binary Mixture. Gas Chromatography.
Exp's 3 and 4 are due.
- Experiment 7. October 9/10 (Week #8)
Isolation of a Natural Product by Steam Distillation.
- Midterm Exam** **October 17** (Week #9)
Labs - October 16/17 - Catch-up with all unfinished experiments
- Experiment 8 October 23/24 (Week #10)
Synthesis of Methyl 1,6-O-Benzylidene- α -D-glucopyranoside.
Exp's 5 and 6 are due.
- Experiment 9. October 30/31 (Week #11)
Identification of Unknowns. Solubility, Functional Groups, Reports. Infra Red Spectroscopy (IR, FTIR).
- Experiment 9,10. November 6/7 (Week #12)
Identification of Unknowns (continued). Synthesis of Benzoin.
Exp's 7 and 8 are due.
- Experiment 10. November 13/14 (Week #13)
Multistep Synthesis. Oxidation of Benzoin to Benzil.
- Experiment 10. November 27/28 (Week #14)
Multistep Synthesis. Reactions of Benzil.
- Final Exam** **December 5** (Week #15)
Labs - December 4/5 - Laboratory check out.
Exp's 9 and 10 are due.

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)