

Syllabus Chem 29A Organic Chemistry Laboratory  
Reedley College Fall 1999

Chem 29A meets: TTh 1:00 am - 3:50 in PHY 77

Instructor : J. Dekker  
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Office hours : M 3:00-4:00, T and Th 9:00-10:00, F 12:00-1:00

Course objectives and outcomes Students will be familiar with safety procedures and lab equipment for semi-micro organic experiments. They will be capable of synthesizing and purifying organic compounds, of measuring melting points, refractive index, optical activity etc. They will learn how to identify unknown compounds by analyzing MS, IR, and NMR spectra. Through interactive computer programs the students will obtain support in thoroughly understanding the concepts taught in the organic chemistry lecture class (Chem 28A).

Textbooks

1. Svoronos/Sarlo Organic Chemistry Laboratory Manual (2nd ed)
2. Solomons Organic Chemistry (7th ed)

Required materials

1. Lab Research Notebook e.g. Jones and Bartlett.
2. A white lab coat.
3. Safety goggles.

Homework Students are expected to come to lab well prepared. This means that the steps to be taken to properly complete the experiment are underlined in the text of the Svoronos/Sarlo Lab Manual or written down in the lab notebook ahead of time. The theoretical explanations in the lab manual are typically too brief to fully understand the experiment. Therefore, preparation reading Solomons's text on the subject is appropriate. At the end of each experiment a brief lab report including 4-6 questions is submitted to the instructor.

Lab report Three experiments are finalized with an extensive lab report using the observations and data collected in the experiment. These lab reports are essentially a write-up of the experiment and a research paper. The student will have to use the resources in the library to find pertinent theoretical background information and this way she/he will fully comprehend the experiment. It will be encouraged to use the Internet. Each student will have easy and free access to the Internet in the lab(PHY 77). Please, refer to Laboratory Report Requirements at the very end of this syllabus.

Lab materials Expensive grounded glassware and other delicate lab supplies will be made available. Students will be held responsible for their own desk inventory.

Attendance Attendance at all labs is mandatory. Role will be taken every time. Students will have to complete all the laboratory assignments. If the student misses two weeks of lab without prior notification of the instructor she/he will be dropped.

Grading To determine the final grade in this class the average of the timely submitted and neatly typed lab reports will count towards 60% and the individually graded labs towards 40% of your final grade.

We will also take into account the working technique, the efforts to reach the experimental goal and the quality and occasionally the quantity of the compound.

General grade break-off A 90% and up, B 80-89%, C 70-79%, D 60-69%, F 59% and lower.

Drop date The drop date is Friday, October 15, 1999. After that date a letter grade will have to appear on your transcripts.

Lab rules It is MANDATORY to use safety glasses at any time that you are in the lab.

You have to perform all the assigned experiments. If for whatever reason you have to miss a lab, you are accountable to inform the instructor ahead of time and make arrangements to make up the lab. This has to be done ASAP. The grade for a missed lab is a zero (0).

Copying of experimental data and answers to questions in lab reports is considered fraudulent behavior and will result in a zero grade for the copier and the originator.

Lab schedule Chem 29A

Fall 1999

Every experiment takes 1-2 lab sessions.

#### Assignment

- 8/17 1. Check in Desk Inventory. Read the Preface of the Lab Manual and read Chapter 1 pgs 1-3. Take the Lab Safety Quiz. Get familiar with MSDS sheets. Practice Lewis structures.  
2. Molecular Orbital Lab (refer to hand-out).
- 8/24 1. Read Ch 3 pgs 19-21 and do experiment 3.1 C.  
2. Refractive Index. Read pgs 26-28 and do experiment 3.3.
- 8/31 1. Simple Distillations. Read pgs 29-31 thoroughly. Do experiment 4.1 part I and part II.  
2. Fractional Distillation. Experiment 4.2
- 9/7 1. Extraction. Read pgs 54-56 and do experiment 6.2.  
2. Recrystallization. Read pgs 66-69 and do experiment 6.3
- 9/14 Stereochemistry and Molecular Models. Read Chapter 2 and answer the assigned questions. Build models using the kits and use the computer programs pertaining to Lewis structures and Molecular Modelling. Use Chem TV I Organic Chemistry: Structure, Section 8 Introduction to Stereochemistry and Section 9, Diastereomers.

- 9/21 1. Equilibrium Constant. Read Ch 7 pgs 78, 79. Do experiment 7.  
2. The Sodium Fusion Test. Read Ch 8 pg 83 and do the tests assigned by your lab instructor.
- 9/28 1. Synthesis of Cyclohexene. Read Ch 10 pgs 123-125. Do experiment 10.1.  
2. Read pg 127. Continue with experiment 10.2
- 10/5 Synthesis and Reactions of Acetylene. Read Ch 11 pgs 141-142. Do experiment 11 followed by the Qualitative Tests of Hydrocarbons and Alkyl Halides.
- 10/12 1. Alkyl Halides. Read Ch 13 pg 151 and do experiment 13.1 The Synthesis of t-Butyl Chloride.  
2. Read pgs 154-156 and do experiment 13.2, the Solvolysis of t-Butyl Chloride.
- 10/19 1. Alcohols. Read Ch 14 pgs 175-177. Do experiment 14.1 The Grignard Reaction.  
2. Continuation of The Grignard Reaction.
- 10/26 1. Read Ch 14 pgs 180-183 and do experiment 14.2 Qualitative tests for Alcohols.  
2. Read pgs 185-187 and do experiment 14.3. Preparation of phenacetin from acetaminophen.
- 11/2 1. Stereochemistry in More Depth. Read Chapter 2 on the R/S designation, Fischer projection formulas and meso compounds. Read McMurry Ch 9 and do the assigned problems.  
2. Introduction to Mass Spectroscopy. Refer to the hand-out. Use the computer programs in the lab.
- 11/9 Introduction to Infrared Spectroscopy. Read Ch 9.1 pgs 89-92. Analyze the assigned spectra using the computer simulation programs.
- 11/11 Veteran's Day. No Lab.
- 11/16 1. Introduction to Nuclear Magnetic Resonance Spectroscopy. Read Ch 9 pgs 105-109. Refer to the hand-out and use the NMR simulation programs.  
2. Analysis of unknown compounds by combination of IR and NMR spectra.
- 11/23 Aromatic reactions. Read Ch 15 pgs 188-191 and do experiment 15.1 Nitration of Bromobenzene.
- 11/25 Thanksgiving Day. No Lab.
- 11/30 1. Friedel-Crafts Alkylation. Read Ch 15 pgs 192,193 and do experiment 15.2.  
2. Synthesis of 2,4-Dinitrophenylaniline. Read pgs 195,196 and do experiment 15.3 A Nucleophilic Aromatic Substitution.
- 12/7 1. Synthesis of Tryptycene. Read pgs 200-203 and do experiment 15.5.  
2. Complete labs and lab reports. Turn in desk inventory.