

CHEM 22500 – ORGANIC CHEMISTRY II

Laboratory

VERY IMPORTANT: STUDENTS REGISTERED FOR THIS LABORATORY COURSE MUST ALSO BE REGISTERED FOR THE ACCOMPANYING RECITATION – CHEM 22501! Recitation class attendance is mandatory for any student enrolled in the lab and a significant portion of the CHEM 22500 lab grade comes from exams & quizzes given in the recitation class!

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Welcome to CHEM 22500 Lab – Introduction & Common Policies

COURSE DESCRIPTION & GRADING OVERVIEW

In addition to carrying out several organic syntheses you will identify functional groups in unknown compounds as well as separate and identify the compounds in an unknown binary mixture. These identifications will require the use of both chemical and spectroscopic methods. You will be required to consult other sources in addition to your laboratory text in this endeavor. In the synthesis experiments you may not be given the procedure in complete detail. You will incorporate information from the recitation and textbook to fill in the details and modify the procedure as needed before you enter the laboratory. You will have to plan your own allotment of time. In order to avoid falling behind you will have to carry out some (previously planned) reactions at the same time you are continuing work on earlier experiments.

The importance of studying the recitation material and applying what you have learned cannot be exaggerated. Don't let yourself become one of the disappointed students who receive a low grade in the entire course due to low scores on their recitation examinations.

Your grade will be assigned on a 1000 point scale which will be explained to you by your instructor. Your point total will be based upon recitation examinations, laboratory technique, the products you hand in, the organization of your work, your write-up of experiments, safe lab practices, cleanliness, and certainly on how well you have planned your work before hand and how well you understand the chemical processes occurring as you work. When you hold a flask in front of your instructor to ask him or her a question about the contents you must tell exactly what you put in the flask, and the exact sequence of operations you have carried out in arriving at that point. Don't expect your teacher to give you an answer (or even be nice to you!) unless you can intelligently discuss what you are doing.

Projected letter grade cut-offs: Grades will be based on the Hunter College grading scale.

A+:	97.5 - 100%
A:	92.5 - 97.4 %
A-:	90 - 92.4 %
B+:	87.5 - 89.9%
B:	82.5 - 87.4%
B-:	80 - 82.4%

C+:	77.5 - 79.9%
C:	70 - 77.4%
D:	60 - 69.9%
F:	0.0 - 59.9

REQUIRED TEXT: Pavia, Kriz, Lampman, and Engel, *A Small Scale Approach to Organic Laboratory Techniques*, 3rd Ed., Brooks Cole. (This lab manual will refer to this textbook as “Pavia”)

LEARNING OUTCOMES: Students will gain experience in the preparation, purification and analysis of organic compounds and in the documentation of scientific reports. The accompanying recitation provides the theoretical foundation that supports and complements the practical learning outcomes below.

At the end of the course, students will be able to:

1. Employ safe practices in the laboratory
2. Understand the chemistry for, and execute multi-step organic synthesis. Specifically qualitatively and quantitatively measure the extent of organic reactions and record observations.
2. Purify organic compounds by simple distillation, fractional distillation, recrystallization, and column chromatography and acid-base extraction
3. Analyze and identify unknown organic compounds by physical (eg. melting point), chromatographic (eg. TLC), and spectroscopic methods (eg. IR and NMR)
4. Record and critically analyze experimental data and prepare written laboratory reports.

RECITATION

Attendance at recitation is a most fundamental requirement. If you should be forced to miss a recitation class you must obtain the class notes from another student. Failure to attend recitation and understand the material presented does more than subject your experiments to the risk of failure. It is essential from a viewpoint of laboratory safety alone to attend all the recitation classes. **Attendance will be taken.**

NOTEBOOK

Your notebook should be bound - not loose-leaf, and have numbered **duplicate** (carbon copy) pages. The original copy is to remain attached to the notebook. The carbon copy is to be removed and submitted to your instructor for grading. **All the graded reports are to be returned to your instructor at the end of the semester.** Refer to your Organic Laboratory I (Chem. 223) notes and to the laboratory text (Pavia, technique 2, p 566-573) for details. **Use ink only. Never use "White-out".**

PLANNING

We stress again the importance of studying and planning your work before you start the experiment! Students who really understand what they are doing in lab will enjoy the work and will look back on their organic chemistry laboratory as a really pleasurable learning experience. Those who do not understand the experiments they are doing will experience frustration and likely fail in addition to exposing themselves and others to the risk of a serious laboratory accident. We will do our best to help you enjoy the course and achieve successful results, but if you don't do your homework and planning, no one will be able to help you. If a laboratory instructor determines that a student has not adequately prepared an experiment, the student will be sent away from the laboratory and will not be allowed to do make-up work in another section. **Points for pre-lab write-up will be awarded at the start of each experiment.**

SAFETY

Students are responsible for knowing the proper safety practices for every experiment, including safety information on all chemicals and procedures used in the experiment. This information can be obtained by reviewing the safety video from Organic Chemistry I laboratory (Chem 223), from the laboratory text (Pavia, technique 1, p 548-565), and from the following handbooks available in the stockroom room 1414 north: Dangerous Properties of Industrials by Irving Sax; Handbook of Chemistry and Physics; Merck Index and Aldrich Chemical Catalog; Webpage www.sigmaaldrich.com. For the safety and convenience of students taking Organic Chemistry I and II the chemicals in room 1404 north have been organized according to the individual experiment. Please return chemicals to their correct positions. **You are to supply your own safety glasses, disposable gloves and paper towels.**

***** REMEMBER THAT SAFETY GOGGLES MUST BE WORN AT ALL TIMES IN THE LABORATORY! ***** Failure to comply with this regulation will result in deduction of points and/or ejection from the laboratory.

WARNING: If you are pregnant or intend to become pregnant during the semester, you are not allowed to work in the Organic Chemistry Lab for reasons significant to the safety of the unborn child!

LAB CLEANLINESS

1. Make sure that the area around your workspace is clean while you're working on your experiment AND before you leave the laboratory. Your instructor will not clean up after you!
2. If you spill something or otherwise make a mess during a procedure, you must clean it up.
3. There are designated disposal containers for broken glass, chemicals (solid and liquid), gloves, etc. located throughout the room. If you are not sure where to dispose something, ask your lab instructor.

MAKING UP A LAB (*Fall & Spring Semesters ONLY*)

In the Fall & Spring semesters, you may make-up for a missed lab session ONLY ONCE FOR THE ENTIRE SEMESTER AND ONLY WITH THE PERMISSION OF THE PROFESSOR COORDINATING THE LABS ("lab coordinator"). **The absence must be due to a proven emergency or a documented reason that the lab coordinator deems legitimate.**

First, contact your lab instructor and the lab coordinator as soon as possible after your absence (or before your absence, if it is anticipated in advance). Then, obtain a Make-Up Permission Form from the Chemistry Lab Stockroom (Room 1414, Hunter North). Arrange to meet with the lab coordinator. Be prepared to explain the reason for your absence, provide documentation and select times on when you would be able to make up for the missed lab based on the schedule of experiments. Obtain the signature of the lab coordinator on the make-up form for final approval and attend the authorized make-up section.

**** STUDENTS MAY NOT ATTEND ANY SECTION THEY'RE NOT REGISTERED IN WITHOUT A MAKE-UP PERMISSION FORM SIGNED BY THE LAB COORDINATOR! ****

Every effort **MUST** be made to schedule makeup sessions during a time when that same experiment is being done by another section. Please make every attempt to complete all experiments during your regular lab session and reserve make-ups for emergencies only. **Permission for make-up will not be granted in cases of student misconduct (e.g.: thrown out of lab for violating rules), negligence (e.g.: slept in, forgot about class, etc.) or failure to complete an experiment on time.**

MAKING UP A LAB (*Summer Semester ONLY*)

Due to the highly condensed nature of the Summer semester schedule, **make-up lab sessions are NOT available.**

LIST OF EXPERIMENTS

DAY	EXP. #	TITLE OF EXPERIMENT
1	1	Check-In & Exp.1: Reduction of Camphor
2	2	Exp.2: Electrophilic Aromatic Substitution: Synthesis and Reactions of Diazonium Ions
3	2&3	Finish Exp.2 Start Exp.3: A Multi-Step Synthetic Sequence:– Synthesis of Dimethyl Tetraphenylphthalate
4	3	Exp.3
5	3	Exp.3
6	3&4	Finish Exp.3 Start Exp.4: Qualitative Organic Analysis
7	4&5	Finish Exp.4 Start Exp.5: Identification of Functional Groups in Unknown Compounds Using Classification Tests and IR Spectroscopy
8	5&6	Finish Exp. 5 Start Exp. 6: Purification and Analysis of a Binary Mixture of Organic Compounds
9	6	Exp. 6
10	6	Exp. 6
11	6	Exp. 6
12	6	Exp. 6
13	6	Exp. 6
14	6	Finish Exp. 6 & Checkout