

**CHEMISTRY 222L**  
**ORGANIC CHEMISTRY LABORATORY II**  
**Spring 2000**

**Instructor:** Ms. Brenda Harmon  
220 A Pierce Hall  
770-784-8341

**Office Hours:** Mon & Tues 11-12  
and by appointment.  
\*\*Drop in during lab times M, Tu, & Th after 2:30

**Lab Manual:** *Organic Chemistry Experiments Microscale & Semi-Microscale*  
Bruce Campbell and Monica Ali  
*The Organic Chem Lab Survival Manual: A Student's Guide to Techniques*  
James W. Zubrick \*\*\*Made available on reserve in the library.  
Carbon-copy notebook and instructor approved safety glasses required.

**Course Objectives:** Students completing this course should gain an understanding of the fundamental theories and techniques of separation, purification, and identification of organic compounds. An emphasis will be placed on learning and understanding the need for safe laboratory practices.

**Attendance:** Lab attendance during your assigned scheduled lab time is mandatory. There will be no make-up sessions for lab. In the event of extenuating circumstances (e.g. a serious illness) arrangements that do not involve a penalty will be made with your instructor. It is the student's responsibility to let the instructor know PRIOR to the missed lab any extenuating circumstances. If the instructor is not contacted prior to the missed lab the student will receive a zero for that lab. NO exceptions!

**Honor Code Policy**

All experiments are to be performed alone unless you are directed to work with a partner. You are encouraged to discuss the experiments with others while in lab. However, your laboratory notebook and scientific reports, including calculations, are to be **your work alone**. You should treat them as you would a take-home test. Collaboration on any report is a violation of the Oxford College Honor Code and will be treated as such. This rule applies to any portion of reports from previous semesters as well as papers available over the internet. Your name on your lab report is your pledge that the work is yours and that you did not give or receive unauthorized assistance.

**Grading and Lab Reports:**

A 15-20 minute quiz will be given at the beginning of each lab period. The quiz will be open notebook and will cover information that should be included as part of a pre-lab write up as well as information and concepts from the previous lab. I intend to determine your level of preparation and your understanding of the material using these quizzes in addition to grading your carbon copies. The quizzes will be followed by a brief discussion of the quiz questions and a short lecture about the procedures to be followed.

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The grading scheme will be as follows:

- 20 % Quizzes
- 20 % Carbon copies
- 10 % Technique
- 10 % 1 Scientific paper (LIMIT- 6 pages!!!)
- 20 % 3 partial scientific papers (results, discussion/conclusion)
- 10 % 1 Formal Summary (qualitative identification of an unknown)
- 10 % Group Poster Presentation

Grades are based on percentages and usually assigned as follows (subject to change at the instructors' discretion):

93 - 100% A	78 - 80% C+
90 - 92% A-	74 - 77% C
88 - 90% B+	70 - 73% C-
84 - 87% B	68 - 70% D+
80 - 83% B-	60 - 67% D
	Below 60% F

#### **Late Work:**

If a daily lab report is turned in late, the penalty is one letter grade per day. In the event of extenuating circumstances penalties may be waived. This will be determined on a case-by-case basis.

#### **Safety Rules:**

- Wear eye protection at all times in the laboratory
- Wear closed toe shoes.
- Tie back long hair.
- Do not wear baggy clothes, especially baggy sleeves.
- Do not wear shorts.
- Do not taste anything.
- Do not eat or drink in the laboratory.
- Do no unauthorized experiments.
- Do not work alone.
- Report all injuries to the lab supervisor.
- Wash your hands when you are ready to leave the laboratory.

#### **Regulations:**

- Read each experiment before you come to lab.
- Leave all reagent bottles on the side table.
- Place waste in the appropriate waste container.*** Do not discard solids in the sink.
- Avoid excessive amounts of a reagent; measure the amount needed.
- Do not insert your pipettes or medicine droppers into the reagent bottles.
- Read the label twice before removing a chemical.

**Breakage/Missing Items:**

You are financially responsible for all equipment made available to you in laboratory. If you are working in a group and no individual accepts the responsibility for the broken or missing item, then every member of the group will equally be billed at the end of the semester. This bill must be paid by the end of the semester or grades may be withheld.

**Cleanliness:**

No one trusts a messy chemist. Each student is expected to leave the work station clean and orderly. A dirty/cluttered work area will result in a reduction of the lab grade.

**Scientific Notebooks:**

Scientific information in itself is valueless unless it is communicated to others in some concise, well-organized form. The first step in scientific communication is the laboratory notebook. A carbon-copy bound notebook is required. Arrange each experiment as follows:

- I. Title. If appropriate include a balanced chemical equation that shows the overall process.
- II. Purpose - 2-3 sentences that state why you are doing this lab. State **why** you are doing the experiment not **what** you are doing. This is the purpose *as a chemist*. Do NOT state the educational objectives of the experiment - believe it or not, I know what I'm trying to teach you.
- III. Procedure & Separation/Purification Scheme - this is a procedural outline of what to do in lab - your summary from reading the experiment **before** class. Do not repeat verbatim what is in the lab manual. Use an outline format in short-hand notation or flow diagrams to guide yourself quickly through the experimentation steps.
- IV. Table of reagents and solvents. This table should include all pertinent information such as molecular weights, densities, bpts, mpts, etc. as well as important hazard information. Mole and gram quantities of reagents used should be included here as well as theoretical yield calculations. (MSDS on-line: <http://siri.uvm.edu/msds/> )

ITEMS I, II, III AND IV SHOULD BE COMPLETED BEFORE YOU COME TO LAB.

- V. Observations & Data - Observations must be recorded in your notebook while you are performing an experiment. The actual quantities of all reagents must be recorded as they are used as well as the amounts of crude and purified products that you obtain. Mention which measurements and spectra are taken. Data should be recorded in tabular form where appropriate.
- VI. Results/Calculations - Calculation of percent yield and interpretation of physical and spectral data. Make sure that the final results are reported clearly and include boxes around important information.

- VII. Conclusions & Summary - Include a succinct discussion of your results. Talk like a chemist! Comment on any sources of error in measurements or reasons why the yield or product purity do not correspond to 100%. Be specific in your comments - do NOT site "human error".



It is correct scientific method to keep a neat, well-organized notebook so you will not have to depend on an imperfect memory. Always use your notebook, not scrap paper, to record observations and data. Always use ball-point pen -- using pencil or fiber pens has resulted in many a chemist watching important data run off of the page when common solvents are spilled on the notebook. The notebook must be neat and legible so that if necessary, you can repeat the experiment by referring only to your own record. NEVER ERASE OR USE WHITEOUT IN YOUR NOTEBOOK! This piece of information that you just obliterated may not have been a mistake.

You must come to lab well prepared or it will be unlikely that you can finish on time. Sections I, II, III, and IV of the lab report should be filled out prior to class. I will collect these before the pre-lab discussion. Section V is the only section that you should fill in during the lab while sections VI and VII are written after the experiment is completed.

The "in lab" notebook reports will be a significant part of your grade for the course. In addition, your scientific papers will be written from your laboratory notebook. It is therefore important to keep concise, accurate, and legible laboratory notes that tell the "story" of what you did, how you did it, and how successful your work was.

# Tentative Organic Lab Schedule

Spring 2001

Week of:	Experiment	Assigned Reading
Jan. 15	<b>NO LAB</b>	Campbell/Alb
Jan. 22	<i>Spectroscopic analysis of an unknown</i> FTIR	Exp. 14 A pgs. 188-198
Jan. 29	NMR	Exp. 14B pgs. 212-214
Feb. 5	<i>Qualitative organic analysis of an unknown</i> Functional group tests on known compds	pgs. 477-483 <i>Handout</i>
Feb. 12	Functional group tests on unknown compds	<i>Handout</i>
Feb. 19	Synthesis of Aspirin <i>microscale</i>	pg. 367 & <i>Handout</i>
Feb. 26	Grignard Reaction	<i>Handout</i>
Mar. 5	Grignard Reaction continued	<i>Handout</i>
Mar. 12	<b>SPRING BREAK!!!!</b>	
Mar. 19	Synthesis of Soap and Polymers	pgs. 419-421 & <i>Handout</i>
Mar. 26	Reduction 	pgs. 268-270
Apr. 2	Elimination 	pgs. 218-220
Apr. 9	SN1/SN2 Group Experiments	<i>Handouts</i>
Apr. 16	Group Experiments	<i>Handouts</i>
Apr. 23	Group Poster Presentations	
Apr. 30	<b>No Lab</b>	