

CHEM 2511K/060,061 ORGANIC CHEMISTRY I LAB Fall 2008
Instructor: Jack Duff, MS Office: E-232 Tel: (678) 915-3603 e-mail: jduff@spsu.edu
Office Hours: M, W, F 10:00-11:00 Tu, Th 10:30-12:00 M 1:00-2:00

Required Text: Techniques and Experiments for Organic Chemistry, Sixth Edition, Addison Ault

Other Material: Handouts for the lab will be provided. Some material may be placed on reserve in the library.

Attendance: Attendance in laboratory is required. Laboratory work missed because of an excused absence should be completed during another laboratory period if possible. Repeated absences will result in a failing grade.

Grading Policy: Your grade in this lab will be based upon your performance in the lab and your understanding of the practice of experimental organic chemistry. Your grade will be determined from completed Data Sheets and/or short reports, submitted samples and spectra, and your Laboratory Notebook and MSDS information as follows:

Submitted Lab Report Sheets	80%
Technique and Preparation (Includes lab quizzes)	10%
Lab Notebook (Includes notebook checks)	10%
Total	100%

Technique and Preparation:

This will be determined by punctuality, pre-lab pop-quizzes, and observation of technique during lab. **Pop-quizzes may be given at the beginning of any lab. No extra time will be given to late students.** The quizzes are designed to encourage you to read the experiment before coming to lab. MSDS information concerning the hazards and modes of absorption of the reagents to be used may be included. MSDS can be accessed at NIOSH Pocket Guide to Chemical Hazards <http://www.cdc.gov/niosh/npg/npgname-a.html>. If you are unable to find it there, shorten the address and look around or use a search engine.

Lab Notebook: You must keep a detailed lab notebook written in ink describing the experiments performed. A format for the notebook is outlined in your lab test on pp. 26-39. A summary follows. Lab notebooks will be checked periodically and collected at the end of the semester.

The lab notebook should have **permanently-bound** lined or square-ruled pages. Include a table of contents and number the pages. **Use the first few pages for a table of contents.** Start the first experiment on page 3 or 5.

The notebook should be written in ink (non-erasable). **Pencil is not acceptable. Do not use white-out!** Bad entries should be crossed out (not scribbled out) and the correct entry written in above, or to the side, or on another page. **Do not tear out pages.** You will probably find it handy to write only on the right-hand side pages at first so that calculations, notes, corrections, etc. can be entered on the left-hand pages if necessary.

Title each experiment at the top of the first page of the experiment. The subtitles, **Introduction**, **Experimental** (with subtitles **Materials** and **Procedure**), **Data and Results**, **Conclusion**, and **References** should be Left-justified and underscored. **Note that the lab notebook should be written up through "Procedures" before you come to lab.** Tables should be used wherever possible.

Descriptive Title and Date

Balanced Equation (If appropriate)

Introduction should give a brief description of the lab to be performed. One or two sentences will suffice.

Materials should include a list of pertinent physical properties of both the reagents and products like melting point, boiling point, solubility, etc. **Any apparatus that you have not yet used should be sketched into your lab book before you get to lab.** (Pencil will be OK for sketches.) Once in lab, record the source of the reagents, when available, and the make and model of any instrument used. Be sure to include sufficient description of instrument conditions and apparatus used to ensure that a reader could reproduce your results.

Procedures are **not** normally written out if an experimenter is following a published method. Reference the lab book with page number or the handout provided. Leave some room for modifications of or deviations from the procedure.

Observations" ("departures from procedure" in your text or handout as well as any notable observations you might want to make) and **Data**" (shown as "yield" in your text as well as distillation temperatures, melting points, etc.) should be **completed in ink during lab.**

Results" (including percent yield and any other calculations necessary) and **Conclusions**" ("comments" in your text) may be completed at home. **Results** should include qualitative descriptions of products as well as yields. Theoretical and percent yields should be clearly calculated (show your work) for any reaction carried out. Conclusions should summarize your experiment. One or two sentences will suffice. A more detailed description (a short paragraph) will be expected in the Short Reports.

Don't forget to cite your **References** of procedure and physical data.

Laboratory Conduct: Follow directions given to you by your instructor and TA's at all times concerning both experimental and safety related procedures. Violation of the former will cost points; violation of the latter will result in expulsion from the lab with a zero grade for the experiment. A second expulsion will result in a failing grade for the course.

Tentative Syllabus Fall 2008:

(Subject to change. You are responsible for keeping up with any changes in experiments that are announced in class or lab. If you miss class or lab, contact me regarding changes.)

<u>Wk</u>	<u>Date</u>	<u>Exp</u>	<u>Readings from Text</u>	<u>Description</u>
1	8/18& 8/20	1a	handouts	Check in and first pre-lab lecture. Moonshine I - Start fermentation.
2	8/25 & 8/27	2a	E74 pp 531- 534	p-Ethoxyacetanilide from p-Ethoxyaniline: Preparation of Phenacetin. Recrystallize from 95% ethanol. Let recrystallized product dry till next week. (Check fermentation. Restart if necessary.)
3	9/1	----	-----	Labor Day Holiday
3&4	9/3 & 9/8	3a 2b	pp 87-90, 344-345 E8	Steam Distillation of Clove Oil from Cloves. Use 30g instead of 75g of cloves and scale down procedure (x30/75). (Complete recrystallization of phenacetin if necessary. Obtain MP of recrystallized Phenacetin, if dry. Check fermentation.)
4&5	9/10 & 9/15	3b	pp 182-198	Extraction of Clove Oil and Distillation of Petroleum Ether. Analyze clove oil by IR. (Obtain MP of recrystallized Phenacetin, if necessary.)
5&6	9/17 & 9/22	1b	Handout & pp 66-76	Moonshine II- Fractional Distillation of Ethanol. (Analyze by GC) (Obtain MP of recrystallized Phenacetin, IR of clove oil if necessary.)
6&7	9/24 & 9/29	4a	pp 92-109	Separation and Isolation of the Components of a Pain Reliever. (IR Phenacetin, GC clove oil as necessary.)
7&8	10/1 & 10/6	4b	pp 116-119	Continue separation of pain reliever. Analyze isolated components by TLC & MP. (Do IR of isolated products only if necessary for identification.)
8&9	10/8 & 10/13			Catch Up.
9&10	10/15 & 20	5 4c	Handout	Introduction to Functional Group Analysis (Continue separation and identification of the pain reliever if necessary.)
10&11	10/22 & 27	6	E17 p 376 - 380	Cyclohexene from Cyclohexanol. Wash the product with dilute aqueous sodium bicarbonate instead of water. Dry the crude organic product over calcium chloride till next week. Skip the distillation. Finish Functional Group Analysis if necessary.
11&12	10/29 & 11/3			Analyze cyclohexene product by IR and GC. Catch up.
12&13	11/5 & 11/10	7	E26 p 403	Synthesis of t-Butyl Chloride from t-Butyl Alcohol. Distil if time permits.
13&14	11/12 & 11/17			Continue Experiment 7, if necessary. Analyze product by IR and GC.
14&15	11/19 & 11/24	----	-----	Catch-up.
15	11/26- 11/30	----	-----	Thanksgiving Holiday Break
16	12/1 & 12/3	----	-----	Check out. Lab books due.

Due Dates for Experiment Reports and Samples			
Week	Dates	Due:	Pts
7&8	10/1 & 10/6	Recrystallized phenacetin sample and packed MP tube with Report Sheet.	10%
8&9	10/8 & 10/13	Clove Oil sample with Report Sheet & IR.	10%
9&10	10/15 & 10/20	Moonshine Report Sheet with Graphs and GC's.	10%
11&12	10/29 & 11/3	Isolated components of a pain reliever (with spectra, if obtained) and report sheets.	20%
12&13	11/5 & 11/10	Functional Group Analysis	10%
14&15	11/19 & 11/24	Cyclohexene sample with Report Sheet, GC, and IR.	10%
16	12/1 & 12/3	t-Butyl Chloride sample with Report Sheet, GC, and IR.	10%
16	12/1 & 12/3	Lab notebook	10%

Note: All samples submitted should be labeled with the compound name, your name(s), and the date. For solids, a packed MP tube should be attached to the vial with a rubber band.