PRINCETON UNIVERSITY
CHEMISTRY 301 & 303
Organic Chemistry Laboratory Syllabus
Fall 2006

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Required for Lab:
1. "The Organic Puzzle Book", 2006 Edition, by Gingrich and Pickering (available at Pequod Copy, U Store)
2. "The Organic Chem Lab Survival Manual ", 6th Edition, by Zubrick
3. A laboratory notebook, equipped with tear-out carbon copy pages
4. Safety goggles

Week	Dates	Experiment / Reading Assignment
1	9/20-22, 25-26	Lab: Check-in; Startup Experiment (Parts A & B only) Reading: OPB, pp 1-6, 7-8 LSM, pp 1-21, 36-48, 61-64, 76-78, 86-92
2	9/27-29, 10/2-3	Lab: Analgesic Experiment Reading: OPB, pp 13-18 LSM, pp 103-121, 126-130, 133-136, 140-143, 79-82, 195-199
3	10/4-6, 9-10	Lab: Continue Analgesic Experiment Reading: OPB, pp 16-18
4	10/11-13, 16-17	Lab: Conclude Analgesic Experiment; Set Up Oxidation-Reduction Reading: OPB, pp 18-20, 22-23, 41 LSM, pp 218-233
5	10/18-20, 23-24	Lab: Oxidation-Reduction Experiment Reading: OPB, pp 23-28 LSM, pp 126-139, 270-289

All reading assignments are from "The Organic Puzzlebook" (OPB) or from "The Organic Chem Lab Survival Manual" (LSM).

Week	Dates	Experiment / Reading Assignment
6	10/25-27, 11/6-7	Lab: Unknown Terpenoid Experiment Reading: OPB, pp 29-31 LSM, pp 164-170, 183-187, 321-322
	10/30-11/3	-- MIDTERM BREAK --
7	11/8-10, 13-14	Lab: Conclude Unknown Terpenoid Experiment Reading: OPB, pp 31-32
8	11/15-17, 20-21	Lab: Nucleophilic Substitution Reactions of Alkyl Halides Reading: OPB, pp 42-44
9	11/22 (No Lab Wed)	THANKSGIVING 11/23-24
10	11/27-12/1	Lab: Bromination of *trans*-Anethole (Only) Reading: OPB, pp 55-57
11	12/4-8	Lab: Conclude Bromination of *trans*-Anethole Reading: OPB, pp 57-59 LSM, pp 294-304
12	12/11-15	CHECK OUT

DEADLINES FOR LAB REPORTS

	FIRST DRAFT	FINAL DRAFT
1) Analgesic Experiment	October 23	November 10
2) Oxidation-Reduction Experiment	November 17	December 15
3) Unknown Terpenoid Experiment	November 27	December 15

OTHER DEADLINES

Acetaminophen Product Quality Control Submission	October 20
Anethole Dibromide Product Quality Control Submission	December 8
Lab Written Exam	December 11 (evening)
Closing Date	December 15

GENERAL INFORMATION FOR CHEMISTRY 301 & 303 LAB

Things to buy before lab

1. "The Organic Puzzle Book", 2006 Edition, by Gingrich and Pickering (available at Pequod Copy, U Store - Third Floor)

2. "The Organic Chem Lab Survival Manual", 6th Edition, by Zubrick

3. A laboratory notebook. We recommend the Student Lab Notebook sold by Hayden-McNeil. These notebooks have tear-out (carbonless) carbon copy pages. Other types of laboratory notebooks can be used as long as they are equipped with tear-out carbon copy pages. If you are in doubt about the suitability of a given notebook, consult the laboratory instructor.

4. Safety goggles.

When you come to lab

Every time you come to lab bring your notebook and goggles. You will also need your student ID card to borrow equipment or to charge broken glassware. YOU MAY NOT BRING "THE ORGANIC PUZZLE BOOK" INTO THE LABORATORY. However, you may bring "The Organic Chem Lab Survival Manual" by Zubrick. Prepare your notebook ahead of time.

Please come to lab wearing appropriate clothing (old clothes that you don't mind being stained or damaged with acid). Clothing that keeps your skin covered is strongly preferred; miniskirts, shorts, and open-toed shoes offer no protection even against spills of boiling water. Long hair should be tied back. Management reserves the right to refuse admittance to those who are not appropriately attired.

Excusals

If you are absent or if you fail to complete an experiment, see the "officer of the day" to get an excusal form. You will present this form to the "officer of the day" in charge of the laboratory when you wish to make up the lab. If you do not comply with the rule about excusal forms, we will not be able to give credit for your work. (These forms are necessary for our bookkeeping system.) Note that an excusal form is only an admission ticket to a section other than your own. It does not waive deadlines.

Grading

Lab reports will be handled on a first draft/final draft basis. Your TA will flag errors of reasoning, and you will be expected to fix them for the final draft, as a condition of receiving a lump sum pass-fail credit. Most of you have already written lab reports in general chemistry. If you haven't, guidelines can be found in "The Rediscovery Book" (the general chemistry lab manual) by Miles Pickering. Your lab TA should also provide you with a set of guidelines before your first lab report is due.

Instead of practical exams, this course has "product quality control" checks. You will submit reaction products and be graded on their purity and, to a lesser extent, on yield.

Finally, there will be a written lab exam at the end of the semester. The purpose of this exam is to provide some incentive to mastering the content of the experiments. All too often, organic lab degenerates into mere "cookbooking". Lab written exams are one way to minimize this problem and are also uniformly objective across sections.

The exact point distribution in this lab is shown below:

Lab pass-fail credit	40 (all or none)
Product quality control checks	24
Lab written exam	136
	200 points

To receive the pass-fail credit, you must:

1) complete all parts of all assigned experiments and three lab reports (with corrections, if requested).

2) produce final products with sufficient purity to have 2 °C melting ranges or better (unless otherwise directed). This level of purity is required if meaningful answers to the puzzles are to be obtained. If need be, recrystallize or seek professional assistance.

3) keep a current, consecutive laboratory notebook of an approved type. Your lab notebook should contain your written pre-lab procedures, as well as data and observations recorded during lab. All notebook entries must be recorded in ink. Pages (except carbons) are not to be torn out. You must bring your notebook to lab, if you are to do any work whatsoever, even a single weighing or melting point. It is important to practice good recordkeeping from the outset. See pp 8-21 in LSM for a suggested notebook format.

No penalty will ever be exacted for having to come back to lab for a second day. (Think about it. If you were an instructor, would you feel more positively about the student who did sloppy work to get by or about somebody who comes in to recrystallize his or her material one more time?) That said, work efficiently with deliberate speed. There are pleasanter places to spend afternoons than the organic lab.

Interpreting TA grades on lab reports

This system is the same as used in general chemistry lab and, like many things in this lab, is modeled on real life.

In particular, it is designed to resemble the procedure by which papers are chosen by scientific journals. A paper submitted by an author is sent by the journal editor to an anonymous referee who then makes comments which are transmitted to the author. Normally the referee recommends whether the paper is to be accepted, revised, or rejected. In this course, your TA will serve as a referee. Hence, there are four possibilities. The report will be either:

1) Accepted (A) : No further work is required.

2) Accepted with corrections (A/C) : There are small errors, which must be corrected, and the report resubmitted.

3) Accepted with major revisions (A/MR) : Make an appointment with your TA before attempting to fix the report. You have major conceptual errors or omissions.

4) Rejected (R) : Make an appointment with the lab instructor.

In submitting a paper for publication, the authors always strive to put their best foot forward, since revisions mean delay and possible loss of priority. Work towards acceptance on the first try. If something is unclear to you, it is much better to ask before you write up the report.

Fixing the report

Most students will receive something less than a grade of accepted on the first draft of at least one of their reports. This is not the end of the world. Do not take the red marks that a TA puts on your report personally; it's far better to have a strict TA who catches every error as you will be better prepared for the lab written exam.

Often all that is required are a few small changes. These should not be corrected on the original report - - the result is likely to be illegible. Make the corrections by attaching an appendix (to be titled "ERRATA") to the original report and making only the changes requested. If major revisions are required for the discussion, be sure to title the new discussion "REVISED DISCUSSION". (With the increasing popularity of word processors, many students submit a "new" final draft of their lab report. If you do so, without also submitting the original draft of the lab report, you will automatically receive a grade of "X" for the final draft of the lab report.)

Deadlines

Your lab reports are due by 4:30 pm on the date indicated on the lab syllabus. Your TA will indicate how and where these are to be submitted. Please remember that it is your ultimate responsiblity to ensure that your lab reports reach your TA's hands. Your TA may grant you one extension of up to one week per semester, but does not have the authority to extend deadlines beyond the "closing date" of the course. (This extension may not be used for the product quality control check(s).) In case of illness or problems beyond your control, consult the lab instructor. Persistent unexplained lateness will result in loss of the pass-fail credit, even if work is otherwise satisfactory.

Working separately

With one notable exception this semester, there are no lab experiments in this course on which you are permitted to work together. Using materials prepared by other students is also "working together" within the meaning of this rule. Your TA does not have the authority to waive this rule - - if necessary discuss the matter with the "officer of the day" or with the lab instructor.

Snafus

Occasionally there will be experiments that do not work, either for the class as a whole or for a particular individual. If the problem is a general one, we will either fix it or excuse students from some part of the experiment on a general basis by letting the TAs know. In general, TAs alone do not have the authority to excuse individuals from an experiment or part thereof.

Resource Center

Assistance will be available in the Resource Center (Frick 323A) for both laboratory and lecture. TAs will be available in the Resource Center most afternoons. A schedule will be posted on the door of the Resource Center during the second week of classes. Extra copies of lecture and lab handouts will be available there.

Check Out

You must check out of the lab at the end of the semester, even if you drop the course. A charge will be made if you fail to turn in your key. If your locker or its glassware are not clean, you will be charged to cover the cost of cleaning.