

Chemistry 333
Organic Chemistry Lab II
Summer 2017
1:00-3:45PM MTWT
Faraday Hall 307
Instructor: Kathy Hoerchler
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Textbook Information:

John C. Gilbert, Stephen F. Martin. Experimental Organic Chemistry – A Miniscale and Microscale Approach. Fifth Edition. ISBN-10: 1-4390-4914-9

Course Objectives

The major objective of this course is to introduce students to common laboratory practices involved in classical and current organic chemistry. In continuum of the techniques obtained upon completion of CHEM 332 (Organic Chemistry Lab I), students will be introduced to common organic oxidation and reduction reactions, Grignard and Wittig transformations, and polymer synthesis. Students should have a general grasp of the typical procedure for performing organic reactions and will be able to replicate experimental details described in research manuscripts by the end of the term. By the end of the term, students will also have developed a solid foundation in laboratory safety techniques universally applicable to research or industrial laboratory settings.

Class Attendance and Safety:

Laboratory attendance is essential to a successful experience in organic chemistry. You are expected to attend every lab session unless you have a university sanctioned excuse. If for some reason you will not be able to attend lab, please let the laboratory instructor know as soon as possible. Labs will NOT be able to be made up and absence from a lab will result in a ZERO (0) for that experiment. Take note that some experiments require multiple periods; failure to attend the first period will prevent you from completing successive experiments and will not be healthy for your grade.

In addition, ***ALWAYS WEAR YOUR SAFETY GOGGLES!!!*** Safety is the number one priority while in the laboratory. All chemical should be considered toxic and hazardous to one's health. Always take necessary precautions when dealing with any chemical.

General Notes:

- 1) Lab starts at 1:00 pm. Be on time and prepared for class.
- 2) Wear appropriate clothing (NO shorts, NO open-toe shoes, NO tank-tops).
- 3) No food or drink of any kind allowed in the lab.
- 4) Read the experimental introduction and complete any necessary prelab exercises.
- 5) Notify me of any glassware breakage, chemical spills, or emergencies immediately.
- 6) Your lab area, lab equipment, etc. must be cleaned prior to leaving lab.
- 7) Long hair must be tied back.
- 8) I should not see any cell phones. The distractions caused by such devices are not

conducive to the laboratory environment and the absence of such is considered a preventative measure. Please take this note seriously because the instructors will and continuous violations of this policy will have a negative effect on your final class grade.

Notebooks:

A laboratory notebook is required for recording experimental data/observations. Approved lab notebooks are only available from the Department of Chemistry and Biochemistry storeroom (FR 363) for \$15 (cash or check). You will need this notebook for every experiment. Failure to arrive to lab with your notebook will result in immediate ejection from the laboratory and a grade of *ZERO* (0) will be awarded for the corresponding experiment.

We will be performing the **miniscale procedures** for all experiments as indicated in the required textbook. Pencils, white out, colored pens (other than black or blue) are NOT permitted or acceptable for your notebooks. Deductions will be made according to these guidelines and periodic notebook checks will be made (unannounced).

Laboratory Reports:

A lab report is to be completed and turned in following the completion of every experiment. All reports will be due at 1:00 PM (the start of lab) on the day following the completion of an experiment. Lab reports should be written neatly and legibly within your notebook. The carbon copies of each lab report are to be retained by the student for their records, while the original copies will be turned in as the lab report. The following information should be included in all lab reports:

- 1) Name and Date
- 2) Experiment Title i.e.(The extraction of Caffeine from Tea)
- 3) Purpose: A brief summary of what you are trying to accomplish and/or learn from this experiment. (Not just a restatement of title).
- 4) Data & Calculation: You want to include all the vital information that you should know prior to coming to lab. For example, if you were extracting caffeine, you would want to draw out the chemical structure, and the important physical properties such as MW, melting point or boiling point. The mechanisms of reactions (if you are running a reaction) must be shown in the lab notebooks and can be obtained from the lab manual. Theoretical and percent yields should be calculated if it pertains to the experiment. Include equations and quantities of materials needed. Show your calculations.
- 5) Procedure: You are expected to write out a general procedure for the experiment to be performed. DO NOT copy the procedure word for word from the lab text book; instead, summarize the information to include anything necessary to complete the experiment. You should be able to follow your rewritten procedure to successfully complete the experiment without the aid of your textbook. Acceptable formats for your rewritten procedures include numbered lists and flow charts.

These five items constitute your **Prelab**, which is to be completed for each experiment. Your

prelab must be recorded in your lab notebook prior to your arrival at lab each day. The purpose of the prelab is to afford the students the opportunity to familiarize themselves with the experiments prior to their execution, and to determine any safety concerns.

- 6) Observations: While performing the experiment, record any color changes, exothermic etc.
- 7) Results: This is the location where you would record the temperature values (i.e. simple distillation), or melting point range (i.e. m.p of the recrystallization of benzoic acid), etc.
- 8) Conclusion: I would like to see a brief, but informative conclusion to the lab. You should state possible errors. Why do you think your yield was low, other than you might have screwed up? Maybe yield was low because you hurried when you should have taken your time, or maybe you lost some in transfer. This should be included in your conclusion. I would also like some mention of what you may have learned in the lab. This may improve your techniques for later experiments.
- 9) Question/Answers – Following the successful completion of each experiment, your instructor will assign questions out of the textbook to be answered and turned in with your lab report. You should write your answers in your lab notebook at the end of each experiment.

The course grade will be assigned based on your point totals from the lab experiments (quality/quantity of reaction products) and reports, quizzes and the final. It is strongly encouraged that you prepare your lab book for the upcoming experiment prior to arriving at the lab. This will make your recording of any experimental observations and experimental discussion easier and will likely result in a smaller overall time requirement.

While performing an experiment, your data should be recorded into a laboratory notebook (in ink), and all notebook pages completed for the experiment must be signed by the instructor prior to your departure from lab. A typical lab report has been provided on the course blackboard site. You are encouraged to work together with your lab partner in completing your lab reports. However, as per university policy, any material that you include in your lab reports should be a representation of your own work. In other words, you and your lab partner should not turn in identical lab reports. This includes answers to any questions assigned following the completion of a given experiment.

Any **UNEXCUSED** absence will also result in a grade of ZERO (0) for that lab.

Lab Reports (10 at 50 points each)	500 points
Quizzes (10 at 5 points each)	50 points
Final Exam	100 points
Total	650 points

Quizzes:

A prelab quiz will be taken prior to every lab. Material included on the quizzes may include any of the following:

- Theory, such as the definitions from the prelab reading
- Procedural questions

- Reaction schemes with missing reactants or products
- Calculations (theoretical or experimental yield, molar equivalent determination, etc.)

Grading Scale:

92 – 100	A
90 – 92	A-
88 – 90	B+
82 – 88	B
80 – 82	B-
78 – 80	C+
72 – 78	C
70 – 72	C-
68 – 70	D+
62 – 68	D
60 – 62	D-
< 60	F

Safety:

Safety goggles are required at all times in the laboratory. No food or drinks are permitted in the laboratory. Waste chemicals must be properly disposed. Refer to the textbook for more comprehensive discussions of safety. Pregnant students should consult with their doctors regarding the risks of being enrolled in this and other laboratory classes.

Your grade in organic laboratory is largely based on the work done in completing the assigned experiments and understanding the techniques/procedures. An important part of any laboratory work involves following laboratory safety rules. Consequently, your grade will also be based upon your adherence to the safety rules. Because of several recent violations of the safety rules in the laboratory classes, a policy is now being instituted in which your grade will reflect your keeping of the safety rules.

The table below describes the penalties that will be assessed with violation of safety rules. Note that the safety goggle violation represents the majority of the grade. The Department of Chemistry and Biochemistry has a strict goggle policy, and you are required to wear your goggles at all times during laboratory classes, except perhaps during discussions. Goggles are available free of charge at the chemistry stockroom, and they must be the type approved by the Department of Chemistry and Biochemistry.

LATE ARRIVAL	Minus 10 points
LATE PRELABS/ LAB REPORTS	Minus 10 points per day
NO GOGGLES	Minus 30 points
NOT CLEANING UP CHEMICAL SPILL (at the balance, at your work area, in fume hoods)	Minus 20 points
FOOD/DRINK/CELL PHONES IN LAB	Minus 10 points
IMPROPER WASTE DISPOSAL	Minus 10 points
DISPOSING GLASS IN WASTE BASKET	Minus 10 points

(Designated “Glass Waste” container should be used)

Date	Experiment
07/17/17	Check In
07/18/17	Exp. 15.5 Relative Rates of Aromatic Substitution (A)
07/19/17	Exp. 16.2 Oxidation of Cyclododecanol to Cyclododecanone (A)
07/20/17	Exp. 17.4 Reduction of 9-Fluorenone
07/24/17	Exp. 18.2 The Wittig reaction (A)
07/25/17	Exp. 19.4 Reaction of Grignard Reagents (A)
07/26/17	Synthesis of Aspirin *
07/27/17	Preparation of Isopentyl Acetate (Banana Oil) *
07/31/17	Preparation of 3-Nitrobenzaldehyde (Aldol Condensation) *
08/01/17	Preparation of Nylon (Polyamide) *
08/02/17	Synthesis of Luminol *
08/03/17	Check Out/ Review
08/07/17	Final Exam

Final Exam will be on **08/07/2017** at the normal lab time and room.

* These experiments are NOT in your lab text-book. All the materials can be found on the blackboard. You are responsible for arriving at the laboratory with a copy of the experimental procedure.