Course Information for Chemistry 212 Lab: Organic Chemistry II Lab

Course: Chemistry 212 laboratory sections meet in STC 308
Laboratory Section 01L: Monday 1:00 – 4:50 p.m.
Laboratory Section 02L: Wednesday 1:00 – 4:50 p.m.
Laboratory Section 03L: Thursday 1:00 – 4:50 p.m.

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Text: Laboratory: *Introduction to Organic Laboratory Techniques : A Small-Scale Approach*, Pavia/Lampman/Kriz/Engel, 2011, ISBN 978-1-4390-4932-7

Grading

Your laboratory grade will be based on 11 of your best experimental write-ups (lab reports) out of 12 (70%), weekly quizzes (10%, 11 of your best out of 12), and spectroscopy problems (15%).

Lab reports (prelab and postlab):	70%
Weekly quizzes:	15%
Spectroscopy problems:	15%
	100%

You are required to submit lab reports in a timely manner. You will incur a 10% penalty for every day that your lab report is late; thus, if a lab report is 10 days late, you will receive a zero for that report. Missed quizzes CANNOT be made up. If you miss a quiz, you will receive a zero for the quiz. There will be absolutely no make-ups for laboratory experiments. If you miss a laboratory experiment that will be your dropped laboratory write-up. If you miss more than one laboratory experiment, you will be assigned a grade of zero for that assignment. The last drop date for the course is *March 25, 2014*. Grading will be based on a standard percentage scale: 100-90 = A; 89-80 = B; 79-70 = C; 69-60 = D; 59-below = F. Dishonest scholarship will earn an automatic zero (0) and initiate prosecution to the fullest extent. Incomplete grades may be given only if the student has a current average ≥70% and is precluded from completion of the course by a documented illness or family crisis.

Lab Cleanliness

You will be expected to maintain a clean and orderly lab. At the end of every experiment, your bench space and hood space must be cleaned. Any equipment utilized during the experiment must be cleaned as well (balances, rotovaps, etc.). You should ensure that sinks and floors are also clean. If the lab

space and equipment that you utilized during the experiment is left dirty and unorganized, you will be penalized 20% on your lab report and quiz associated with that experiment.

LABORATORY NOTEBOOKS

*You must write down what you observe and measure during the time of the experiment. Compose the laboratory report in sufficient detail to allow someone else to repeat the experiment exactly. The observations section of the report must be the original notes taken during the course of the experiment (take detailed, **legible** notes during the experiment). You can also submit a typed version of your observations if you wish, but you MUST submit your original notes taken during the experiment.*

Each laboratory report will consist of the following sections:

I. Prelab Section – 40 points (due at the beginning of the laboratory)
- *A. Title – 2 points*
- *B. Objective – 3 points*
- *C. Procedure – 15 points*
- *D. Physical Constants/Reagent Data – 10 points*
- *E. Safety – 5 points*
- *F. Stoichiometry/Theory – 5 points*

II. Postlab Section – 60 points (Must be completed by the beginning of the next laboratory period.)
- *A. Modifications to procedure – 5 points*
- *B. Observations – 15 points*
- *C. Results – 20 points (This section must be signed by TA on the day of the laboratory.)*
- *D. Discussion – 20 points*

CLASS ATTENDANCE POLICY: All students are expected to attend classes on a regular basis and attendance will be recorded. The Department of Chemistry adheres to the attendance policy set by the University as stated in the most current Undergraduate Catalog. Being late by more than 5 minutes is equivalent to missing a laboratory. You must be on time in order to take a quiz or an exam. Excessive absence is defined as missing more than 10% of the laboratory sessions without excusable reasons. Excessive absence will be reported to the Dean of the College and the Dean of Students. In addition, according to the TAMU-Commerce Procedure A13.02., good class attendance will be necessary in order to pass the course.

STUDENT CONDUCT POLICY: All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment (see Student's Guidebook, Policies and Procedures, Conduct). Any student engaging in disruptive behavior will be dismissed from class on the first offence. A second offence may constitute dismissal from the course.

LEARNING OUTCOMES / COURSE OBJECTIVES:

By the end of the semester I intend for my students to have realized a number of objectives.

1. Learn basic synthetic organic chemistry techniques, such as how to set up reactions, how to monitor the progress of a reaction, how to calculate the amount of starting materials needed, how to calculate percent yields, and how to properly clean glassware at the end of an experiment.
2. Learn basic techniques for the isolation and purification of organic molecules, such as distillation, recrystallization, chromatography (TLC and column), and extraction.

3. Learn how to characterize organic compounds using techniques and instrumentation such as melting point, boiling point, retention factor, ^{1}H-NMR, ^{13}C-NMR, IR, and UV/Vis spectroscopy.
4. Learn the safety requirements and methods needed to work in an organic chemistry laboratory.
5. Learn how to safely handle, utilize and dispose of chemicals.
6. Learn how to document laboratory experiments, how to maintain a scientific notebook.
7. Know the importance of organic chemistry and its relationship to various other disciplines such as biochemistry and medicinal chemistry and our daily lives.

Tentative Laboratory Schedule

Week #	*Chapter/Topic*	*Dates*	*Experiments & Assigned Problems*
1		*1/13-1/17*	*Check-in, safety video, safety exam*
2		*1/20-1/24*	*Lab will not meet this week since Monday is a holiday*
3	*Experiment 17 and 18*	*1/27-1/31*	*Training on how to use computational chemistry software Spartan (second floor computer lab). Read all of chapter 17 and 18 before class. Conduct exercises 17A-17D and 18 A-D. Read the essays in the chapters before class.*
4	*Combinatorial chemistry (similar to Experiment 12)*	*2/3-2/7*	*Experimental procedure is similar to 12. A handout will be given out that describes this lab and procedure. Read the essay on page 84 and ALL of Experiment 12. Answer questions 1-3, 6-8, page 90,in your post-lab report. Record an IR and 1H-NMR spectrum of your ester and interpret the spectrum for your post-lab report.*
5	*Oxidation of Alcohol*	*2/10-2/14*	*A handout will be given out that describes this lab and procedure.*
6	*Experiment 34*	*2/17-2/21*	*Read all of experiment 34. Conduct experiment 34: Aqueous-Based Organozinc Reactions. Answer questions 1-4, page 292, in your post-lab report.*
7	*Experiment 42*	*2/24-2/28*	*Conduct experiment 42. Relative Reactivities of Several Aromatic Compounds. Read all of experiment 42. Answer questions 1-3, page 338, in your post-lab write-up.*
8	*Experiment 41*	*3/3-3/7*	*Read all of experiment 41. Conduct experiment 41: 1,4-diphenyl-1,3-butadiene (Wittig reaction). Answer questions 1-5, page 333, in your post-lab report.*
9		*3/10-3/14*	*Spring Break*

The next 3 labs will test your synthetic chemistry skills as the product from one experiment will be utilized for the next experiment!! So hopefully you have material at the end of each lab that will serve as your starting material for the subsequent lab.

10	*Experiment 32A*	*3/17-3/21*	*Read all of experiment 32: Multistep Reaction Sequences: The Conversion of Benzaldehyde to Benzilic Acid. Conduct experiment 32A. KEEP your product at the end of this experiment because you will use it next week. Answer questions 1 and 4 page 271-272, in your post-lab report.*
11	*Experiment 32B*	*3/24-3/28*	*Read all of experiment 32: Multistep Reaction Sequences: The Conversion of Benzaldehyde to Benzilic Acid. Conduct experiment 32B: Preparation of Benzil. Use your product from last week as this weeks starting material. KEEP your product at the end of this experiment because you will use it next week.*
12	*Experiment 32C*	*3/31-4/4*	*Conduct experiment 32C: Preparation of Benzilic Acid. Use your product from last week as the starting material. Obtain yields from each individual step and the overall yield for the three step reaction for your report. Answer questions 1-3 page 277, in your post-lab report.*
13	*Experiment 47AB*	*4/7-4/11*	*Set up experiment 16, which you will complete next week. Read the essay on pages 371-382: Polymers and Plastics. Conduct experiments 47A and 47B. Polyesters and Polyamides (preparation of Nylon 6,6). Polymers. Answer questions 1-7 in the post-lab report (page 389).*
14	*Experiment 16*	*4/14-4/18*	*Read the essay on page 123: Ethanol and Fermentation Chemistry. Complete experiment 16 which was started last week. Answer questions 1-6 in your post-lab write-up (page 130).*
15	*Experiment 37*	*4/21-4/25*	*Read all of experiment 37. Conduct experiment 37: The Aldol Condensation: Preparation of Benzalacetophenones (Chalcones). Answer questions 1, 2, and 4 page 312-313, in your post-lab report.*
16		*4/28-5/2*	*Check-out. A spectroscopy problem to be solved in class will be handed out in class and will be due by the end of the lab period.*
17	*-*	*5/5-5/09*	*no labs*