Widener University
Spring 2015
Chemistry 258
Organic Chemistry II Laboratory
Lecture (KH 231): W 3:00 pm – 3:50 pm (All sections)
Labs (KB 438):
Th 8:00 am – 10:50 am (Sec. A)
Th 11:00 am – 1:50 pm (Sec. B)
Th 2:00 pm – 4:50 pm (Sec. C)
W 7:00 pm – 7:50 pm (Sec. D)

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"UNLESS someone like you cares a whole awful lot, nothing is going to get better. It's NOT." (Dr. Seuss' The Lorax)

Required Textbooks and Materials

Chemistry 257/258: A Greener Organic Chemistry Laboratory, 4th edition by L. Bastin and K. Bhat, pdf file available in Shared Files of CampusCruiser

Green Organic Chemistry: Strategies, Tools, and Laboratory Experiments, K.M. Doxsee and J.E. Hutchison, Thomson: Brooks/ColeCengage, 2004. ISBN: 0-534-38851-5. Can be purchased used on amazon.com.

The Organic Chem Lab Survival Manual: A Student's Guide to Techniques, *7th* edition, J.W. Zubrick, John Wiley & Sons, 2012. ISBN-13: 9781118083390. Can be purchased used on amazon.com.

Laboratory Notebook by Jones and Bartlett. Must be a bound notebook with carbon copies and page numbers throughout. A very good version can be purchased at the Widener bookstore. ISBN: 0-558-96530-X.

Safety Goggles and lab coat

Course Description

In this course we continue our journey through organic chemistry. We will continue to learn methods that allow us to control the formation and breaking of covalent bonds in order to produce chemicals with desired structures and properties. In this second semester course, we will emphasize the reactions of organic compounds. We will use the knowledge of molecular orbital theory from Organic Chemistry I to understand the mechanisms of these reactions in addition to applying these reactions to the synthesis of pharmaceutically and industrially important organic molecules. We will also use these chemical reactions as identification tools to determine the identity of several unknowns. By the end of this course, you will be able to synthesize, purify, and characterize a variety of organic compounds. Welcome to Organic Chemistry II laboratory and enjoy!
Prerequisite: Chem 255, 257. Corequisite: CHEM 256

Course Goals

Students will: 1) be able to take an experimental procedure from the literature and reproduce the experiment; 2) be able to design an experimental procedure to determine the identity of an unknown organic compound using chemical tests, and/or spectroscopic data; 3) be able to obtain and interpret spectra (IR, UV-Vis and NMR); 4) be able to synthesize and characterize a synthetic target; 5) be able to give an effective scientific presentation; 6) be able to write an effective paper; 7) be able to use presentation tools to create effective tables and graphs; 8) work safely in the laboratory; 9) use chemicals without harming the environment; 10) recognize how chemistry relates to other disciplines and to societal issues. This knowledge will be judged based on laboratory reports, oral presentations, exams, laboratory notebooks, and meetings.

Readings

The purpose of the readings is to prepare you for the laboratories. You **MUST** read the assigned readings **before** the appropriate lecture and laboratory classes (as outlined later).

Make-up Lab

Absences from lab for any reason must be discussed with your lab instructor in advance of the lab being missed (except for unexpected illness, in which case a note must be brought from your physician or the health center). You must contact your instructor within 24 hours after missing a lab in order to submit a proper excuse for an absence.

Grading

Synthesis Final Report	120 pts
Unknown Reports (2 at 80 pts each)	160 pts
Oral Presentations for unknowns (2 at 30 pts each)	60 pts
Dye Final Report	80 pts
Lab Notebooks for Synthesis	50 pts
Lab Notebooks for Unknown or Azo Dye	25 pts
Laboratory Technique	30 pts
Final Exam	100 pts
Total	625 pts

Final Lab Reports

Your final reports will be in various forms. The unknowns will be reported using report sheets provided on the course website. The Dye laboratory final report will be a short typewritten paper. The final report for the synthesis experiment will be in the form of a formal typewritten paper in the format of a *Journal of the American Chemical Society* article. You will be provided instructions for both reports at the appropriate time. Late reports will be penalized 25% per day.

Lab Notebook

Each experiment entry in the laboratory notebook consist of a pre-lab due at the beginning of the lab period, in-lab observations due at the end of the lab period, and a post-lab write-up due at the beginning of the first lab period following the completion of the experiment. All portions should be written in your lab notebook and carbon copies placed in the file folder located in the laboratory. The pre-lab will be checked at the beginning of the lab period for that experiment paying particular attention to the safety/hazard information that you collected for the experiment. You will not be allowed to begin the experiment until the pre-lab is completed.

Oral Presentation(s)

You will give two oral presentations. The first oral presentation will be to your instructor in their office during week 14 and will concern unknown A. You will be asked to convince us of the identity of your unknown based upon the data that you have collected and analyzed. This is NOT a PowerPoint presentation. You will orally present your information and logic to us in an informal setting using ONLY your lab notebook and the NMR correlation tables provided in the lab lecture. During the oral presentation, you will be handed the ^{1}H-NMR of your unknown and asked to analyze it on the spot. The second oral presentation will be to the entire class during your laboratory period in week 13. You will present your data and analysis for unknown B using PowerPoint and convince us that you have correctly identified your unknown.

Final Exam

The final exam will cover the background and theory (reactions, mechanisms, etc.) of each experiment in addition to testing your understanding of the experiments you have performed. You are expected to understand the purpose of each chemical used in an

	experiment. We will also provide you with chemical and spectroscopic data for an unknown compound and expect you to provide the identity of the compound.
Academic Fraud	The Science Division and the Chemistry Department strictly enforce the University's policy on cheating and other forms of academic fraud. Cheating on an exam or laboratory report will result in automatic failure of the course. See the 2011-2012 Undergraduate Catalog for details.
Grievance Procedure	Please refer to the student handbook, the science office, or your instructor if you have a problem.
Student Health	The laboratory experiments conducted in this course are designed with safety in mind. However, some students may have medical conditions that may increase sensitivity to the chemicals used in the laboratory. This is especially true for students who may be pregnant. If you have any medical condition that may increase your risk, you should speak with your physician and the course instructor so that arrangements can be made to ensure your safety.
Syllabus Modification	We reserve the right to change/modify the syllabus throughout the semester if needed. All changes will be announced in class and you are responsible for those changes whether you are present or absent during those class times.

Lab Schedule

Week	Laboratory		Lecture Topic	Reading	Report Due on:
	Dates	*Experiment*			
1	1/14 & 1/15	Check-in	Introduction, Synthesis – Part A	Handout	
2	1/21 & 1/22	Exp. 7 – Synthesis	Synthesis – Part B	Handout	Exp. 7 Report Due Week 7
3	1/28 & 1/29	Exp. 7 – Synthesis	Synthesis – Part C	Handout	
4	2/4 & 2/5	Exp. 7 – Synthesis			
5	2/11 & 2/12	Exp. 7 – Synthesis	Unknowns	Handout	Unknown A Report due Week 11
6	2/18 & 2/19	Exp. 7 – Synthesis Exp. 8 – Unknown A (mp/bp & IR)	Unknowns	Handout	
7	2/25 & 2/26	Exp. 8 – Unknown A			
8	3/4 & 3/5	SPRING BREAK	NO LAB		
9	3/11 & 3/12	Exp. 8 – Unknown A			
10	3/18 & 3/19	Exp. 8 – Unknown A			
11	3/25 & 3/26	Exp. 9 – Unknown B			Unknown B due Week 14
12	4/1 & 4/2	Exp. 9 – Unknown B			
13	4/8 & 4/9	Exp. 10 - Dyeing Crystals	Dyeing Materials	Handout	Exp. 10 Report due Week 16
14	4/15 & 4/16	Exp. 10 - Dyeing Crystals			
15	4/22 & 4/23	Exp. 9 – Unknown B (Oral Presentations during lab)	Dye lab	Handout	
16	4/29 & 4/30	Check-out			
17	5/6	Final Exam 10:15 am – 12:15 pm Location: TBA			