Spring 2009
Chemistry 258
Organic Chemistry II Laboratory
Lecture (KB 231): W 3:00 pm – 3:50 pm
Lab (KB 438):
Section A: Th 8:00 am – 10:50 am
Section B: Th 2:00 pm – 4:50 pm

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"All of these activities of living organisms are chemical in nature. To understand them we must understand the substances, how they are made up of molecules, how the molecules are made up of atoms." (Linus Pauling)

Required Textbooks and Materials

Chemistry 257/258: Organic Chemistry Laboratory, 1st edition by Loyd D. Bastin, Thomson Brooks/Cole Custom Publishing, 2007

A Laboratory Notebook: Must be a bound notebook with carbon copies and page numbers throughout. You are more than welcome to use your laboratory notebook from Chem 257.

Office Hours

See above and by appointment

I am very willing to help you at nearly anytime. So, if my office door is open, please feel free to stop by and ask for help. However, be aware that I can't help 15 students who all have different questions the afternoon or morning before a report is due. It is imperative that you **ask** me for help. If you can not make my posted office hours or you would rather setup a time to meet when no one else can interrupt, I am happy to find a time that we can meet and discuss your questions and/or concerns.

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 identify 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, spectroscopic data, and a combination of both; 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 <u>for any reason</u> must be discussed with your lab instructor <u>in advance</u> 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

Dye Final Report	80 pts
Unknown Final Reports (2 at 70 pts each)	140 pts
Sulfa Drug Final Report	120 pts
Oral Presentations for unknowns (2 at 30 pts each)	60 pts
Lab Notebook (2 at 25 pts each)	50 pts
Laboratory Technique	50 pts
Final Exam	100 pts
Total	600 pts

Final Lab Reports Your final reports will be in various forms. The Dye laboratory final report will be a short typewritten paper (see pages 127-128 of the laboratory book for more information). The unknowns will be reported using report sheets provided on the course website. The final report for the sulfa drug 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 find instructions for the format of this report on page 193 of the laboratory book. 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. See pages 81-85 of the laboratory book for additional details.

Oral Presentation(s) You will give two oral presentations. The first oral presentation will be to your instructor in my office concerning unknown A. You will be asked to convince me 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 me in an informal setting using ONLY your lab notebook and the NMR correlation tables that I provide. During the oral presentation, you will 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 our Wednesday lecture. You will present your data and analysis for unknown B using PowerPoint and convince us that you have correctly identified your unknown. These presentations will take place on 3/12, 3/19, 3/26, 4/2, and 4/9.

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. I 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 student handbook 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 I 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:
	Lab Date	Experiment		
1	1/15	Check-in, Exp. 8 - Dyeing Crystals	Introduction, Dye lab (pp.119-128)	1/29
2	1/22	Exp. 8 - Dyeing Crystals	Dyeing Materials	
3	1/29	Exp. 9 - Unknowns	Unknowns (pp.129-186)	Unknown A - 2/19
4	2/5	Exp. 9 - Unknowns	Spectral Problems	Unknowns B – 3/12
5	2/12	Exp. 9 - Unknowns	Spectral Problems	
6	2/19	Exp. 9 - Unknowns		
7	2/26	Exp. 9 - Unknowns	Sulfa Drug (pp. 187-193)	
8	3/5	SPRING BREAK	NO LAB	
9	3/12	Exp. 10 - Sulfa Drug Synthesis	Oral Presentations	4/29
10	3/19	Exp. 10 - Sulfa Drug Synthesis	Oral Presentations	
11	3/26	Exp. 10 - Sulfa Drug Synthesis	Oral Presentations	
12	4/2	Exp. 10 - Sulfa Drug Synthesis	Oral Presentations	
13	4/9	Exp. 10 - Sulfa Drug Synthesis	Oral Presentations	
14	4/16	Exp. 10 - Sulfa Drug Synthesis	Course Evaluations	
15	4/23	Check-out, Sulfa Drug Synthesis		