Chemistry 221L: Basic Organic Chemistry Lab I, Fall 2017

Section	**Chem 221L-A**
Meeting Time	**Monday 2:30 – 5:30 pm**
Location	**OSB 401**
Instructor	Dr. Annette Neuman
E-mail	annette.neuman@emory.edu
Office	OSB 404
Office Hours	Tuesdays 1:00–3:00 pm, Wednesdays 1:00–3:00 pm, Thursdays 9:45–11:45 am (drop-in) Or by appointment (e-mail me to set up a time)

Description

The organic chemistry lab is a place where you will have the opportunity to discover how organic molecules behave and apply your knowledge to real-world separations and analytical methods. You will think through the scientific method and design your own experiments. Through this process, you will learn to think like a chemist. You will also have the opportunity to hone your skills in scientific writing through several lab reports.

Learning Outcomes

By the end of Chemistry 221L, students will

1. Apply the concepts of molecular structure, polarity, and intermolecular forces in order to predict physical and chemical properties and explain how laboratory techniques work.
2. Use physical and chemical properties to separate mixtures and identify pure substances.
3. Practice scientific record keeping skills in a laboratory notebook.
4. Concisely present the context, methods, evidence, and evaluation of experiments in a brief scientific paper.
5. Diagram a separation procedure using a flow chart.

Course Materials

Required:
Carbon-copy notebook (your old general chemistry notebook is fine to start)
Three-ring binder for background information and reading materials
Safety glasses
Pen
Basic, four-function calculator

There is no lab manual for this course. I will post pre-lab reading materials and procedures to the course Canvas page. You are responsible for printing these materials and bringing them to lab.

Grading

Your lab grade will comprise the following components:

Lab sessions	7 @ 50 pts	350 pts
Lab reports	3 @ 50 pts	150 pts
Written final		100 pts
Total		600 pts

Your final letter grade will be determined by the usual scale. *There is no automatic rounding or curve to course grades*.

	93		90		87		83		80		77		73		70		67		60	
A	|	A-	|	B+	|	B	|	B-	|	C+	|	C	|	C-	|	D+	|	D	|	F

Lab Sessions

Each lab session is worth **50 total points:**

30 points notebook content and style
10 points pre-lab quiz
10 points post-lab quiz

Pre-lab quizzes: A 5-minute quiz will be given at the beginning of most lab periods to determine your level of preparation. You will be allowed to use the procedure and table of reagents sections of your laboratory notebook to answer the questions specific to the procedure. Other questions will investigate your understanding of the material.

Post-lab quizzes: A 10-minute quiz will be given at the end of most laboratory sessions. These quizzes will cover the concepts behind the experiments or techniques just completed and may include concepts from previous experiments. Much of the information learned in this lab class is cumulative; therefore, you will be held responsible for these thematic concepts throughout the semester.

Lab Reports

Your lab reports should be 2-3 pages (typed, double-spaced) and follow the **Science Writing Heuristic (SWH)**. This differs from a traditional lab report format that you may have used in other science classes. The SWH has been found to help students make connections, draw inferences, and generate meaning from their laboratory work (*1*).

The SWH report is written with the goal of answering a series of questions designed to help you understand the experiment you are doing and the underlying concepts associated with the experiment.

A SWH grading scheme is below. A more detailed guide will be shared in a separate document. Each lab report will be graded out of a total of 50 points.

All lab reports must be submitted as hard copy. You will draw chemical structures and other figures by hand; thus, electronic submission is not acceptable.

Lab writeups will typically be due at the beginning of lab on the Monday after you complete the experiment. Some experiments are two or three weeks long. See the schedule on p. 4 for details.

Section	Categories	Points
Beginning question(s)	What do I have to investigate or figure out about this concept? What will be the main question(s) guiding my learning?	5
Claims	What can I claim to answer my beginning question(s)?	10
Evidence	What qualitative and quantitative observations did I make? What calculations did I make? What balanced equations have I written? **All evidence presented should address the beginning question.**	20
Reasoning	What is my interpretation of my data (graphs, class data, trends, or other analysis) to support my claim(s)?	10
Reflection	Have I identified and explained sources of error and assumptions made during the experiment? How might I improve the procedural design or method to account for the issues addressed above?	5

1. Rudd II, J. A.; Greenbowe, T. J.; Hand, B. M.; Legg, M. J. *J. Chem. Ed.* **2001,** *78,* 1680.

Written Final Everything you learn in this course is interconnected. Every technique builds on previous techniques and concepts. You will be learning a series of techniques that you will have to use and apply throughout the year. Not only do you need to learn HOW to perform all the techniques, but you must also understand the chemistry behind them. Consequently, you will be tested on your understanding and application of these techniques in an hour-long written exam.

Attendance Attendance is mandatory. In the event of extenuating circumstances (e.g., a serious illness), please contact me BEFORE the beginning of the lab session to make arrangements. If I am not contacted prior to the missed lab, the student will receive a zero for that lab.

Late Work All late assignments will receive an automatic grade reduction of 5% per day late. If an assignment is due at the beginning of lab, submitting it after lab counts as one day late.

Safety The laboratory can be a safe place if you follow a few safety rules. If you violate the safety rules, your score for that day's work will be docked, and you may not be allowed to work in the lab. You learned the safety rules from the safety video; these are the most important of the rules:

a. You must wear safety glasses, *even if you wear eyeglasses*. The chemistry department sells several styles; you may also use your own, subject to approval of your lab instructor. The chemistry department does not loan glasses. While in the laboratory, you must wear the safety glasses at all times; even if you have finished with the experiment, others may still be working. You will not be allowed to be in the lab without your safety glasses.
b. You must wear closed-toed shoes in the lab. If you come to lab with open-toed shoes, you will have to leave and put on proper shoes before returning.

Honor Code Lab sessions are an ideal setting to promote collaborative learning. You are encouraged to discuss experiments with others before lab and while in lab. However, **your lab reports must be your work alone**. You must not work with another student after the lab is over. Collaboration on any report is a violation of the Oxford College Honor Code and will be treated as such.

Tentative Organic Lab Schedule
Fall 2017

Experiment #	**Date**	**Experiment Title**	**Assignment Due**
Intro	Sept. 11	Intro/safety/check-in	
Exp. 1	Sept. 18	Introduction to Separation	
Exp. 2	Sept. 25	Thin-Layer Chromatography	
Exp. 3	Oct. 2	Infrared Spectroscopy	Introduction to Separation/TLC/IR lab report due by 5 pm Wed. 10/11 (OSB 404)
---	Oct. 9	NO LAB (Fall Break)	
Exp. 4	Oct. 16	Liquid/Liquid Extraction	
Exp. 5	Oct. 23	Acid/Base Extraction	Acid/base extraction lab report due Mon. 10/30
Exp. 6	Oct. 30	Isolation of Clove Oil from Cloves	
Exp. 7	Nov. 6	Separation of the Components of Clove Oil	Isolation of clove oil/ separation of components of clove oil lab report due Mon. 11/13
Final	Nov. 13	Written Final Exam	
	Nov. 20	NO LAB (Thanksgiving)	