

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

Meeting Times	Lab Section B2: Tuesday 9:45 am – 12:45 pm (<i>first meeting Sept. 12</i>) Lab Section B3: Tuesday 1:40 pm – 4:40 pm (<i>first meeting Sept. 12</i>) Lab Section C: Wednesday 2:30 pm – 5:30 pm (<i>first meeting Sept. 13</i>) Lab Section E: Friday 2:30 pm – 5:30 pm (<i>first meeting Sept. 8</i>)		
Location	OSB 401		
Instructor	Dr. Austin Scharf		
E-mail	austin.scharf@emory.edu		
Office	OSB 206		
Office Hours	Mondays 2:30-3:30 pm (drop-in) Thursdays 3:30-4:30 pm (drop-in) Or by appointment (e-mail me to set up a time)		
Website	https://canvas.emory.edu/courses/36654		
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 <ol style="list-style-type: none">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 brief scientific reports.		
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 (black or blue only) Basic, four-function calculator (Please do not bring an expensive calculator into the lab. I have seen too many calculator keys dissolve in the organic solvents!) <i>Cell/smart phones are not permitted in the laboratory.</i> 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	Lab sessions Lab reports Written final exam	10% per lab session x 7 lab sessions = 70% overall 5% per lab report x 3 lab reports = 15% overall 15% overall	
Your final letter grade will be determined by the usual scale. <i>There is no automatic rounding or curve to course grades.</i>			

	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 **100 total points**:

- 70 points notebook content and style
- 10 points pre-lab quiz
- 10 points post-lab quiz
- 10 points safety and stewardship in the lab

Laboratory Notebooks: The lab notebook is the most important document in the entire course. It is the record of *everything* you do in the lab, from your preparation *before* lab, to the procedures you undertake *during* lab, to the analysis of your data *at the end of* lab. As such, it accounts for *almost half of your entire grade in Chem 221L*.

Pre-lab quizzes: A 5-question quiz, available on Canvas, will be due before each lab period to determine your level of preparation. You'll be free to use any resources you wish to complete this quiz.

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.

Safety & Stewardship (see below for more details on safety policy): Because safety in the laboratory is paramount, you must adhere to the safety policies in the lab. *You will never be penalized for an accident*, but you will lose safety points for coming to lab underprepared or disobeying safety rules. In addition, the laboratory space is shared by seven separate sections; to be good stewards of the communal space, we expect you to maintain your lab bench and hood in a safe, clean, and organized manner.

Lab Reports

Scientific discoveries build on the shared wisdom of the scientific community. If this were not the case, every scientist would have to rediscover the structure of the atom or the evolution of species for herself. Long before these scientific discoveries are picked up by the mainstream media or appear in textbooks, they are reported in scientific journals. Therefore, writing is crucial to the progression of science. Scientific writing is also helpful to your development as a scientist. Evaluating data and communicating it in a concise and cohesive manner forces you to understand the chemical principles behind your experiments.

For these reasons, you will have the opportunity this semester to build skills in scientific writing. You will submit **three brief lab reports**, each worth 5% of your grade, for a total of 15%.

First lab report: Discuss Experiments 1-3 (separation, TLC, and IR)

due two weeks after the completion of Exp. 3 (i.e. Oct. 13, 17, 18)

Second lab report: Experiment 5

due one week after the completion of Exp. 5 (i.e. Oct. 27, 31, Nov. 1)

Third lab report: Experiments 6-7

due two weeks after the completion of Exp. 7 (i.e. Nov. 17, 21, 22)

All lab reports will adhere to the following format:

Identifying Information
Beginning Question
Claim(s)
Evidence
Reasoning
Reflection, Errors, & Improvement
Literature Cited

Your complete lab reports must be typed, and may be no longer than **three pages**, double-spaced. It is easy to be long-winded and write everything that may be relevant. It is more challenging to write concisely. Think carefully about your experiment, evaluate the evidence you collected, and present only the most important information in a coherent fashion.

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.

Safety & Stewardship The chemistry lab can be a dangerous place, but with the proper training, caution, and care, it can be an exceptionally effective learning environment... not to mention some fun! Some of the most important safety guidelines are listed here; the complete safety policy will be covered during the first course meeting.

Attire (Personal Protective Equipment). All students are expected to come to lab wearing lab-appropriate clothing. This means that shirts should have at least short sleeves, and should entirely cover the chest and abdomen (no tank tops or similarly “scant” shirts). Shoes should entirely enclose your feet and not pose any tripping hazards (no sandals, ballet flats, or heels). While shorts and skirts are permitted, they are discouraged; it is preferable to come to lab wearing durable, long pants that entirely cover the ankles (jeans or slacks are best). Students are expected to wear safety glasses *at all times while in the lab*; regular eyeglasses are not sufficient, and should be covered by splash-resistant glasses. Hair that reaches past the shoulders must be tied back. Students who arrive to lab without the appropriate attire will be sent back to their dorm to change, and will lose safety points.

Safe Practices. Each experiment will come with its own set of new techniques and considerations. Students are expected to read all handouts prior to lab, and familiarize themselves with proper, safe methods for each technique undertaken. The instructor will also discuss safe practices before each experiment begins. These practices may involve proper use of laboratory glassware, safe storage and use of reagents and solvents, proper operation of laboratory equipment, and safe disposal of hazardous waste. Students who do not demonstrate consistent, conscientious, and intentional safe practices in the lab may lose safety points. Egregious or repeated violations of safe practices may result in exclusion from the course, after verbal and written warnings from the instructor.

Stewardship. The organic chemistry lab is a communal space, shared by six other sections. We all share benches, hoods, drawers, equipment, reagents, and glassware. As such, we must be good stewards of our community resources. This means that students should leave the lab *cleaner and more organized than they found it*: glassware should be cleaned and placed on

drying racks; reagents, solvents, and other items replaced where they were found; equipment in clean, working order, and the hoods and benches wiped clean with paper towels.

- Attendance** Attendance at all lab sessions is *mandatory*, and there are no makeup sessions. 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** Lab reports turned in late will lose 5% if turned in within 24 hours of the due date, an additional 10% if turned in within 24-48 hours, and will receive **no credit** if turned in more than 48 hours past the due date. Weekends are included. Late work that is turned in over a weekend must be scanned and submitted by email *in addition* to submission of a hard copy.
- 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 and final written examination 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 #	Dates	Experiment title
Introduction	Sept. 8, 12, 13	Intro/safety/check-in
Exp. 1	Sept. 15, 19, 20	Introduction to Separations
Exp. 2	Sept. 22, 26, 27	Thin-Layer Chromatography
Exp. 3	Sept. 29, Oct. 3, 4	Infrared Spectroscopy
---	Oct. 6, 10, 11	NO LAB (Fall Break week)
Exp. 4	Oct. 13, 17, 18	Liquid/Liquid Extraction
Exp. 5	Oct. 20, 24, 25	Acid/Base Extraction
Exp. 6	Oct. 27, 31, Nov. 1	Isolation of Clove Oil from Cloves
Exp. 7	Nov. 3, 7, 8	Separation of Components of Clove Oil
Final	Nov. 10, 14, 15	Written Final Exam