

Chemistry 222L-05 Organic Chemistry II Lab- Spring 2017

Professor: Cooper Battle
Office: Noyce 2207
Phone: (641) 269-4347
e-mail: battleco@grinnell.edu

Contact policy: I generally check my e-mail between 8 AM and 6 PM on weekdays and once or twice a day on weekends, and will get back to you within 24 hours. Please feel free to stop by my office. If my door is open, I will make time to talk if I am able. If my door is closed, it means I'm in the middle of something and would appreciate not being interrupted.

Teaching Assistant: Alex Glebov-McCloud (glebovmc@grinnell.edu)

Office Hours:

Tuesday: 1-2 PM, Wednesday 11-12 AM, Thursday 10-11 AM.

I will be in my office and available to meet with individuals or groups during these scheduled office hours for questions or discussion about either the lecture or the lab. If you cannot make these times, feel free to call or e-mail me to schedule another time that works better for you. With less than 24 hours of notice, I may not be able to accommodate you but I will try to work something out.

Lab Time & Location: Friday, 1:00-3:50 PM, Noyce 2022/2133

Required Texts:

1. John W. Lehman, *Multiscale Operational Organic Chemistry: A Problem Solving Approach to the Laboratory Course*, 2nd Edition, Prentice-Hall, **2009**
2. Grinnell College Organic Chemistry 222 Lab Manual

Other Required Supplies:

1. Permanently bound laboratory notebook
2. Safety Goggles
3. Calculator

Lab Outline:

A fundamental part of Organic Chemistry is learning how to safely manipulate and characterize organic compounds in a hands-on fashion. This lab is tied in closely with material you will learn in the lecture during the semester, providing you with an opportunity to learn the technical skills that go along with the course knowledge.

Each lab section will meet once per week, with a pre-laboratory lecture and discussion taking place in Noyce 2022, followed by lab activities in Noyce 2133. In the lab, you will be assigned your own drawer with equipment at the beginning of the first period. You will have a key for the drawer that you must bring with you to lab at all times, and will be required to return at the end of the semester. You are responsible for all of the materials in the drawer, and will be required to return them in good shape at the end of the semester.

You are expected to come to lab prepared each week, having done any necessary pre-lab reading and activities, with a prepared lab notebook. This will allow you to be ready to start when we get to lab, and know what to do, in what order, and how to do so safely and effectively.

Attendance:

Lab attendance is mandatory. Since each lab focuses on learning a specific technical skill, missing one can severely impact your learning of the material for the semester. There are a few valid reasons for missing a lab. If you must miss one, please talk to me ahead of time so any necessary special arrangements can be made for you to make up the lab. You are not allowed to use the lab on your own for any reason due to safety concerns. Unexcused lab absences can lead to an F in the class.

General Conduct Rules:

1. **No food or drink allowed in the lab.** This includes chewing gum.
2. No smoking is permitted in the lab, or anywhere else in the building.
3. Horseplay, rowdiness and practical jokes do not belong in a chemistry lab. Working in a chemistry lab already carries safety risks enough without adding any others on top.

Personal Protective Equipment & Clothing:

Safety goggles must be worn at all times when in lab. Even if you are not working with chemicals, someone else might be, and there are always chemicals out in the lab that could potentially be knocked over and splash.

Never touch “common equipment” while gloved. Gloves are designed to protect us from hazards we handle. If we handle something hazardous and then touch a communal item (door knob, telephone, computer mouse or keyboard, calculator) that either ourselves or someone else will eventually touch without gloves, we are spreading the hazard rather than protecting ourselves from it. Do not touch anything while wearing gloves that you or someone else will touch in the future without gloves.

Appropriate clothing must be worn during lab. Please wear older clothes that you can tolerate losing in case of a spill. Your clothes should cover the majority of your exposed skin, and not have any loose portions that can get in the way or cause an additional hazard. Long pants, shoes that cover the entirety of your feet and socks should be worn to protect from drops and spills. At least a short-sleeved top should be worn to protect your upper arms. The use of contact lenses in lab is not recommended, but they can be worn under safety goggles. I will need to make sure I know who is wearing contacts in case of an emergency, as they create additional considerations. If you come inappropriately dressed for lab, you will be asked to leave and change into lab-appropriate clothing.

Lab Notebook Guidelines:

It is important to perform safe, well-planned, and well-documented procedures in the lab. Planning carefully ahead of time ensures that your time in the lab is well spent and productive, and minimizes any potential safety hazards.

Recording your results is one of the most important parts of doing good science- frequently, as scientists we have to refer back months (or even years) to verify new data against old. **Write everything down.** If you aren't sure whether you should record something or not, err on the side of writing it down. You may not need it in the future, but if you do you will be very glad you did. Your lab notebook will be checked randomly throughout the semester, so it should be as up-to-date as possible at all times.

A good, complete, notebook entry for an experiment should contain three general sections: things you do before lab, things you do during lab, and things you do after lab. It is important to clearly delineate what you did before lab, and what you do during lab, as well as clearly separating different sections of your notebook. Consistent organization is very important- anyone reading your notebook should easily be able to open it to a day, determine what you did on that day and why.

1. Each page should be numbered sequentially, odd numbers on left-hand pages and even numbers on right-hand pages.
2. Page 1 should contain your contact information.
3. Pages 3-5 should contain your table of contents (Lab Title, Lab Date & Page Numbers for all experiments performed).
4. Your first experiment will start on Page 6.
5. **Each page should be dated at the top.** Additions to a previous entry (i.e., new characterization data) should have the date of addition noted along with the entry if it differs from the rest of the page.

General sections you should include in every experiment entry:

1. Pre-lab & Separation/Flow Scheme:
 - This section should contain your experimental plan for the days work, including notations of any specific hazards.
2. Title, References, Reaction Scheme & Introduction/Purpose:
 - These sections are how you “set up” your experiment for the day. What is the experiment, what references are you using for experimental design, what reaction are you performing, and why are you doing the experiment?
3. Experimental/Procedure, Data & Observations
 - As you perform an experiment, you will have major and minor deviations from procedure- each of these should be clearly noted in your lab notebook. All exact amounts of reagents used, any measurements taken during lab, and any changes to reagent types or formulations should be noted specifically.
 - Some of the most important data in a lab is qualitative- note your observations and thoughts as you progress through an experiment. Color changes, difficulty solubilizing materials, and any other things you notice can be extremely helpful in troubleshooting a project down the road.
4. Calculations, Results & Discussion
 - A good lab notebook does not stop with experimental data. Consistent calculations and data interpretation is just as important to your final conclusions, and should be noted in your lab notebook.
 - Along with results from the lab, you should take the time to write some brief points of discussion. These can draw attention to observations that may explain aberrant data, compare your results to accepted values, and draw conclusions from what your experimental data reveals.