

Description: A one-semester-hour laboratory course designed to accompany organic chemistry lecture.

Pre- and Co-requisites: Grade of 'C-' or better in 1 year of General Chemistry Lecture and Lab and Chem 223

Materials: Making the Connections<sup>3</sup> By Anne B. Padias (ISBN: 978-0-7380-7436-8)  
Permanently-Bound Composition Notebook

Safety goggles are provided during safety training and must be brought to every lab. A full-length lab coat is also required.

Course Homepage: Announcements, assessments, extra copies of the handouts, the grade book, etc. are posted on [Sakai.luc.edu](http://Sakai.luc.edu). You are responsible for this material, so you should check Sakai frequently.

Grading: Course grades consist of the following components:

Information Resources Assignment	10 pts
10 Pre-lab Exercises, 10 pts each	100 pts
10 Data Collections, 10 pts each	100 pts
9 Post-lab Exercises, 20 pts each	180 pts
Formal Lab Report	40 pts
In-class Exam via Sakai	80 pts
Online Exam via Sakai	<u>40 pts</u>
	550 pts total

A>94%, A->90%, B+>88%, B>84%, B->80%, C+>78%, C>74%, C->70, D+>68%, D≥60%, F<60%

Information Resources Assignment: This assignment is completed via Sakai in order to familiarize you with authoritative, reliable resources to consult for finding physical property data on organic chemicals.

Pre-Lab Preparation: Success in organic lab depends on advance preparation. Therefore, there are several things you must do before coming to lab. One major component of your pre-lab assignment is to thoroughly read and understand the experimental procedure and the assigned background reading listed on Sakai. Before coming to class, you must complete the pre-lab exercise via Sakai. Some of the pre-lab questions will come directly, word-for-word out of the reading assignments to ensure students are completing the readings. Students are allowed unlimited attempts until the due date, and assessments must be submitted to count. Work that is saved but not submitted before the deadline will be ignored. Spelling, grammar and significant figures count.

Data Collections: Students are strongly encouraged to record their results in a laboratory notebook. The exact format of the notebook is up to the student. However, there are some recommendations in the text and posted on Sakai. A properly-maintained notebook keeps all of your results in one place and will facilitate the completion of the post-lab exercises and the end-of-the-semester exam on Sakai.

At the end of each experiment and before you leave lab, you must report your experimental data to your Teaching Assistant. The TA will record your results for each experiment. If you do not report your results before you leave the lab, you can email your data to your TA before the start of the next lab period but it will only be worth half credit. No data will be accepted after the start of the next lab period.

One of the most important facets of experimental work is that data should be recorded as completely and accurately as possible. Sometimes, important discoveries are made when things don't behave "as they should." Therefore, it is critical that you report your actual data and not what you think the correct answer should be. Students who complete the entire experiment in good faith will receive all of the Data Collection points. You do not have to worry about your data being "right". Data Collection point deductions will be for safety violations, not participating in collecting the data, not finishing the experiment, etc.

Post-lab Exercises: Short questions pertaining to the experiment just completed will be posted on Sakai. These should be completed after lab ends and are due at the beginning of the next lab period. Students are allowed three attempts until the due date, and assessments must be submitted to count. Work that is saved but not submitted before the deadline will be ignored. Spelling, grammar and significant figures count. The Spectroscopy lab does not have a Post-lab exercise.

Formal Lab Report: A formal, type-written lab report over the Substitution experiment will be due following the Thanksgiving holiday break. This report should be clearly written using proper scientific grammar (do not use first person tense like "I did this" or "we saw this"). More detailed guidelines for the report will be discussed in class and posted on Sakai.

In-Class Exam: The first exam will be completed in person after the first five experiments. Be sure to bring a No. 2 pencil and your Student ID with you. You do not need to bring your goggles and lab coat. The exam will include material covered in class, the background readings, as well as co-requisite and pre-requisite material. Points will be deducted for not following instructions.

Online Exam: The second exam will be completed via Sakai and is due at the beginning of the lab period in the last week of class. Only one submission is allowed. The exam is not timed, so students may save their work and return to it later, but the exam must be submitted to count. Work that is saved but not submitted before the deadline will receive an automatic 20% deduction. Spelling, grammar, and significant figures count. The Spectroscopy lab is not covered on the exam.

Re-grades: All requests to have items re-graded must be submitted in writing within one week after the graded materials are returned to the student.

Attendance: You are expected to attend every lab session. Due to safety constraints and size limitations, you will not be allowed to make up an experiment in another section. Missing a lab period will result in a zero for the Data Collection portion of that experiment. However, you may still complete the Pre-lab Exercise and Post-lab Exercise. The normal due dates will still apply and you are responsible for all of the material on exams. Missing more than 2 experiments will result in automatic failure of the course.

There will be an attendance sheet that students are required to sign upon entering the lab. It is critical that the attendance sheet exactly match who is present in the lab in the event of an emergency. If you must leave the lab after signing in (e.g.; to use the restroom, get a drink of water, etc.) be sure to log your exit on the attendance sheet. For safety's sake, in order to better results and to be fair to your lab partner, limit your time out of the lab. Students who leave the lab for a period longer than 10 minutes will receive a deduction from the Data Collection points for that experiment.

Additionally, you must be signed in prior to the start of the pre-lab lecture to ensure everyone's on-time arrival to class. Tardiness or just not signing in will result in a point deduction from the Data Collection points for that experiment. Students must be present for the pre-lab lecture because important safety-related information is covered. Any student who misses a significant portion of the pre-lab lecture will not be allowed to perform the experiment and will receive a zero for the Data Collection points for that experiment. Safely working with chemicals requires your undivided attention! As such, any behavior that indicates that you are not paying attention during the pre-lab will result in the student not being allowed to perform the experiment. This includes, but is not limited to, sleeping, looking at one's phone or computer, talking, etc.

Safety Rules: Read the safety rules carefully and follow them throughout the course. Anyone who does not adhere to the safety rules will receive point deductions and may not be allowed to remain in the laboratory. You will be provided a pair of safety goggles at the beginning of the course. You must bring your eye protection and lab coat with you to every class, as well as dress in appropriate clothing and footwear. One time during the semester, a student may borrow goggles, a lab coat or socks. There will be a deduction from the Data Collection points for each item. These items cannot be borrowed more than once per semester.

**Academic Integrity:** Each student is expected to do her/his own work. Although the lab is constructed so students may work in pairs during an experiment, all work submitted for a grade must be an individual effort. The penalty for academic dishonesty is a grade of 'F' for the course.

**Late Policy:** Unless otherwise specified, materials that are submitted late but on the same day as they were due will receive a 10% deduction. There will be an additional 25% deduction for each day or portion of a day, including weekends, they are late after that.

**Email:** You must use your Loyola email address when contacting the TAs or the instructor for this course. Emails from outside sources are often blocked automatically. In the subject line of your email, put Chem 225-section number and TAs name.

**Course/Instructor Evaluation – IDEA:** Loyola has the IDEA program for instructor and course evaluations. At the end of the semester, you will complete an online evaluation of this course based on criteria set by IDEA and by the instructor. For this course, the main objective is learning to apply course material. In particular, our objectives are to characterize organic compounds by measuring their physical properties, isolate organic compounds using a variety of purification techniques and, lastly, to synthesize organic compounds using chemical reactions. Keep these objectives in mind throughout the course.

**Extra Procedure:** On the last day of class, students will be given the opportunity to perform an extra lab experiment, Thin-Layer Chromatography. The 10 Data Collection points from this experiment can be used to substitute for the student's lowest Data Collection score. This can be useful for making up the points lost due to a missed experiment or an experiment that did not give good results. Only one substitution is allowed per student.

**Extra Credit:** At the request of the organic chemistry lecturers, we will cover how to assemble your molecular models kits during the second week of class. This week is shortened due to the Labor Day holiday, so students from the two Monday sections may come to any lab section that week. This molecular modeling exercise is optional. Students who complete it can earn up to 10 points of extra credit.

**Co-Requisite Chem 223 Lecture Course:** Students wanting to drop lecture after midterm may stay in the co-req lab only if midterm grade, posted in LOCUS, is a D or better. Students should continue to attend lecture until the week of the drop date to gain as much background knowledge as possible. For Fall 2016, students wishing to drop lecture, and have a mid-term grade of D or better, can seek assistance from the Department of Chemistry and Biochemistry office beginning Monday 10/31 at 9:00am through Friday 11/4 at 4:00pm. Students with a midterm grade of F must drop the co-req lab along with the lecture. No exceptions.

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## Experiments

1. Functional Group Tests
2. Boiling Point Determination
3. Melting Point Determination
4. Distillation and Refractive Index
5. Crystallization
6. Extraction
7. Substitution
8. Elimination
9. Natural Product Isolation
10. Spectroscopy
11. Thin-Layer Chromatography