



# UMBC

Department of Chemistry and Biochemistry  
**Chem 351L, Organic Chemistry Laboratory I**  
Summer 2014

<b>Instructor</b>	Dr. Mark Perks   Chemistry 549C   x52789   perks@umbc.edu Office Hours – Tues, Thu, Fri 11 a.m.-12:00 p.m. and after lab, or by appointment
<b>Text</b>	Williamson, K.L.; Masters, K.M. <i>Macroscale and Microscale Organic Experiments, Sixth Edition</i> ; Houghton-Mifflin: New York, 2011 (customized).
<b>Prerequisite</b>	CHEM 101, CHEM 102, and CHEM 102L with a grade of C or better A student completing CHEM 351L without prerequisites will receive an F. A student who has taken CHEM 352L can not repeat CHEM 351L.
<b>Corequisite</b>	CHEM 351 is a corequisite for the lab course CHEM 351L. <b>If you drop CHEM 351 you must also drop CHEM 351L</b>

Chem 351L is the laboratory complement to Organic Chemistry 351. Students will learn the techniques to separate, purify, and characterize organic compounds and will perform fundamental functional group transformations. Separate rubric handouts each day will detail the expectations for the student to complete the experiments in a safe and informed manner.

## Syllabus

Date	Experiment Title	Readings†	Procedure*
May 27	Enrollment Verification		
	Check-in, Safety, ACS videos	pp. 1–34	rubric
May 29	Basic Operations (w/Discovery)	pp. 76–77; 97–98; 133–140	rubric
June 3	Thin-layer/Column Chromatography	pp. 164–177	Ch. 8: 1
June 5	Recrystallization and Melting Points	pp. 41–55; 61–80; 83–84	Ch. 3: 2, 3 & 4; Ch. 4: 2 (phthalic acid)
June 10	Reactive Acid-Base Extraction	pp. 141–149	Ch. 7, Part 2: 3
June 12	Stereoisomers (w/Discovery)	handout	rubric
June 17	Free-Radical Chlorination	pp. 205–211; 326–332	Ch. 18: 2
June 19	Nucleophilic Substitution (w/Discovery)	pp. 318–325	Ch. 17: 1 & 2
June 24	Distillation and Boiling Points	pp. 55–58; 86–92	Ch. 5: 4, 5
June 26	Dehydration of Alcohols	pp. 213–216	Ch. 10: 1
July 1	Bromination of Cholesterol	pp. 340–345	Ch. 20: 2 & 4
July 3	Final Exam, Check-Out		

† Be sure to review the relevant sections from your 351 textbook for all experiments except for chromatography, recrystallization and melting point, distillation and boiling point.

\* All procedures used will be macroscale except for the melting point determination and nucleophilic substitution which can only be performed microscale.

## Grading

Good Laboratory Practice	10%	Laboratory environments require respect for lab-mates, supervisors, and equipment and strict adherence to safety policies. The first grading rubrics enumerate the basics of good citizenship in the laboratory. Points are deducted for non-compliance with the standards. Repeated offenses will result in dismissal from the course.
Experiments	50%	
Pre-Laboratory Questions	10%	Pre-laboratory questions must be handed in immediately upon entering the laboratory. You are expected to complete these exercises on your own. Text portions of the questions must be typed. Equations, graphs, calculations and chemical figures can be hand-drawn. Show your work for any quantitative questions. Late work will not be accepted.
Laboratory Quizzes	10%	Each lab period will begin with a 15-minute quiz on the procedure and pre-lab questions and your knowledge of the hazardous properties of the chemicals you will work with, and safety procedures for the day's lab. Late arrivals will not be given extra time to complete the quiz. Students arriving more than 1/2 hour late will receive a zero grade for the entire experiment.
Implementation	10%	For each experiment you will receive a detailed grading rubric for all the techniques and skills in the experiment. As your TA is circulating and discussing the experiment he/she will be noting any errors.
Notebook	15%	A bound or page-numbered laboratory notebook is required to organize your preparation before lab and for recording the results of the experiments during the laboratory session. Before-lab entries are worth 5%, entries made during lab are worth 4%, and after lab entries are worth 6%. See the grading rubric for the first lab for proper preparation and use of the laboratory notebook.
Post-Laboratory Questions	10%	Questions on the previous experiment are due at the next meeting of the lab. You are expected to complete these exercises on your own. Text portions of the questions must be typed. Equations, graphs, calculations and chemical figures can be hand-drawn. Show your work for any quantitative questions. Late work will not be accepted.
Lead-Off Quiz	10%	Each lead-off will begin or end with a short 4-6 question quiz on the previous experiment using the Turning Technologies (TT) classroom response clickers. Also throughout the lead-off lecture another few questions will be asked on the next experiment being discussed.
Discovery	5%	Four experiments are quite short and after completion of experimental work students will form <i>ad hoc</i> collaborative teams of three to complete Discovery-style worksheets on the chemistry of the experiment underway or related lecture material.
Final exam	20%	

A standard grading scale is used: A — 90–100; B — 80–90; C — 70–80; D — 60–69 .

## Learning Objectives

Every experiment specifies detailed learning objectives. They will fall into one of these major categories.

- Proper handling of experimental apparatus.
- Precautions for conducting the experiments safely and awareness of toxic and corrosive properties of chemicals used.
- Names and structures of the compounds you work with.
- The background theory of stereochemistry, regiochemistry, equations and mechanism.
- Application of experiments accomplishing synthetic steps to analogous reactions.
- The purpose of the steps in the procedure of the experiments both practically and how the procedure relates to theory. Why the choice of the solvent? Why additions in two portions? Why cool? Why add base? Why add acid? Why wait?
- Stoichiometry calculations and general laboratory practice
- The physical properties of the compounds. It's not necessary to memorize specific values but instead the effects of size, polarity and hydrogen bonding. Also the properties of common chemicals.

## Absences

If a laboratory is missed for reasons of health or unavoidable absence it must be justified by **documentation**. If you miss laboratory you are still responsible for all the paperwork, pre- and post-lab of course, but also notebook. Obtain observations and results from a classmate and enter them in your notebook as if you had been in lab but, of course, provide attribution to your source. Then write up your own interpretation and conclusions of the data.

## Academic Integrity

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. This instructor holds a profound repugnance for dishonesty and will pursue against discovered fraud the severest punishment allowed under the prevailing policies.

Following are examples of academic misconduct that are not tolerated at UMBC in any academic exercise.

1. Cheating on a quiz or exam by bringing a crib sheet, by accepting information from another student, or providing another student with information. Note that discussion of clicker questions is permitted.
2. Using another student's clicker to register a response for them or allowing another student to register a clicker response for you.
3. Fabrication: Intentional and unauthorized falsification or invention of any information or citation.
4. Facilitating Academic Dishonesty: Intentionally or knowingly helping or attempting to help another in an act of academic dishonesty.
5. Plagiarism: Knowingly representing the words or ideas of another as one's own, including works of art and computer-generated information/images.

Academic and professional integrity is particularly important in experimental work in science. For a laboratory course certain key practices are worth noting:

1. Notebooks must have a cloth binding, not spiral wire, and all entries must be made in ink.
2. Entries in the notebook must represent the student's own description of authentic experimental work carried out by the student and the student's own conclusions of the meaning of the results.
3. Out-of-class assignments must be completed independently. You may discuss your ideas for question solutions with your classmates but a grade of zero will be given for the assignment if evidence of straight copying is apparent and a second infraction will result in a course grade of F.

All other provisions of the complete Student Academic Conduct Policy are in effect. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook or the UMBC Policies section of the UMBC Directory.