

CHEM262L: Organic Chemistry Laboratory



Fall 2019 All sections

Chapman 125 classroom and Morehead Labs 300, 301 and 303

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COURSE DESCRIPTION: CHEM262L affords the opportunity to perform some reactions that you have learned in organic chemistry lecture courses. In the organic chemistry lab, you will acquire hands-on experience with many different techniques associated with manipulating organic compounds. You will see how Green Chemistry can be incorporated into organic syntheses, and you will utilize NMR, UV-Vis, CV and/or melting points to evaluate your products.

COURSE OBJECTIVES:

- *Work safely in a laboratory setting* by following all rules, guidelines, procedures, and instructions.
- *Work with a lab partner* to share and complete all activities safely, accurately, and in the allotted lab period.
- *Use organic lab techniques including* column chromatography, crystallization, distillation, gravity filtration, reflux, suction filtration, and thin layer chromatography.
- *Use laboratory instrumentation and interpret resulting data including* an NMR spectrometer, gas chromatograph, UV-Vis spectrometer, CV, and melting point apparatus.
- *Maintain a laboratory notebook* with procedures prepared before lab, information recorded while performing an experiment and analyses, and calculations completed following experimental work.
- *Practice sound scientific writing and proper citations* in lab reports and research summary.
- *Interpret the Ten Principles of Green Chemistry* as related to lab procedures.

During the final six lab periods, students will be involved in a Course-Based Undergraduate Research Experience (CURE), and the objectives differ compared to a traditional laboratory course. Students are involved in research and thinking as a scientist.

- *Use of scientific practices:* Students will engage in asking questions, proposing hypotheses, gathering and analyzing data, developing and critiquing interpretations, and communicating findings.
- *Discovery:* Students will be investigating scientific questions to generate and test new hypotheses.
- *Broadly relevant work:* Students will create reports of their findings for the Carolina Chemistry Department.
- *Collaboration:* Students will work in teams to develop, test, and communicate their hypotheses and results.
- *Iteration:* Students will build on and revise aspects of other students' investigations to accumulate sufficient data for analyses.

In this research-exposure course, you will be working with a Graduate Research Consultants, Nicholas Venditto, Nicholas Onuska, and Susanna Liang, and they will assist you in the research project. The GRC program is sponsored by the Office for Undergraduate Research (our.unc.edu). I encourage you to visit this website to see other ways that you might engage in research, scholarship and creative performance while you are at Carolina.

TOPICS COVERED:

Esterification of an alcohol

Electrophilic Aromatic Substitution

Aldol condensation

Oxidation of an alcohol

Wittig reaction

Dehydration of an alcohol

Michael reaction

PREREQUISITES: In order to be enrolled in CHEM262L, you must have completed, with a passing grade, CHEM261/261H, and have passed or be currently enrolled in CHEM262. You must have completed, with a passing grade, CHEM241L or CHEM245L. If you were first enrolled prior to Fall 2009, please see the instructor. *It is an honor code violation to be enrolled in a class without the proper pre-requisites.*

SAFETY: In order to avoid personal injuries and injuries to fellow students while performing experiments in your chemistry laboratory courses, you are required to follow the safety rules as outlined beginning on pp ix of the CHEM262L lab manual. Any questions about safety rules should be directed to your TA, instructor, Laboratory Supervisor, or Laboratory Director. Repeated failure to observe safety rules will result in removal from the lab.

ENROLLMENT: You must attend the first meeting of your lab section in Chapman 125 during the week of August 26th at the start of your normal lab time. If you miss the roll call for this meeting, you will be dropped from your lab section.

HONOR CODE and ACADEMIC INTEGRITY

The Department of Chemistry faculty adopted the following policy on September 9, 1977.

“Since all graded work (including homework to be collected, quizzes, papers, mid-term examinations, final examination, research proposals laboratory results and reports) may be used in the determination of academic progress, no collaboration on this work is permitted unless the instructor explicitly indicates that some specific degree of collaboration is allowed. This statement is not intended to discourage students from studying together or working together on assignments which are not to be collected.”

Behavior in this course is governed by the University of North Carolina's Honor System and the codes contained therein. The entire code, and information pertaining to the code, can be found at: <http://studentconduct.unc.edu/>

The guiding principle of academic integrity is that the work submitted by a student must be that student's own work. In this course students will sometimes be required to work in pairs or groups to collect

experimental data. This can lead to misunderstandings regarding academic integrity. In those cases when you work with other students, you must clearly indicate on your Title Page who your partner or partners were.

When writing up your lab report there is no collaborative work. You must write your own report, answer your own questions, and work up your own data. If you are having difficulties or have questions, you need to see your TA for help. Collaboration on lab reports is a violation of the University Honor Code and will be treated as such.

A second area where misunderstandings of academic integrity arise is with regards to when you should reference external sources in your lab report. The submission of any material that is substantially the same as some other written document or source (i.e., a journal article, a textbook, a lab manual, a book) that is not properly referenced constitutes a violation of academic integrity. Using someone else's words or ideas without giving credit for their work is called plagiarism. Furthermore, simply rearranging the words from a source to make them seem like your own words is also plagiarism.

The following situations below will be treated as honor code violations.

- Unauthorized collaboration. **NOTE: Unauthorized collaboration is defined differently for each lab course. Please read carefully.** All lab reports must be written independently, and this includes all ChemDraw structures and files.
- Plagiarism. The ideas presented in your report must be your own. If you present someone else's ideas or work (from books, old lab reports, the Web, the lab manual) as your own, this is plagiarism. You can present facts from an outside source, as long as you properly reference the source.
- Allowing students to use your work as their own. Do not allow your partner or other students to have access to your lab reports. You may share data if you collected the data together, but everything else (calculations, graphs, tables) must be done alone.
- Using old lab reports, even if you just want to glance over them, is an honor code violation.
- Do not rearrange a paragraph or some other piece of work that is not yours in the hope of disguising the work as your own.
- Using an old lab manual from a previous semester.

Established by the Undergraduate Labs Committee, April 2014

Two additional notes: 1) You are not allowed to refer to Course Hero, Get Study Room, or any other online site that provides access to old lab reports. Use of these sites is an honor code violation. 2) The final research summary is different from a traditional lab report. Students will work with a lab partner to prepare the final research summary.

CLASS WEBPAGE: The website for this class is located at <https://www.unc.edu/sakai/>. You will need to check this site regularly for class announcements. This site will be used to post a variety of course information and material: syllabus, schedules, assignments, quizzes, useful resources, sample lab reports and lab notebooks, grades, etc. You must become familiar with this site since you are responsible for knowing how to utilize this site to take quizzes, submit assignments, follow schedules, etc. Please see your TA if you need any assistance.

REQUIRED COURSE MATERIALS: (* required for lab check-in)

- 1) * Approved safety goggles – you can purchase goggles during check-in using your ONE card
- 2) * CHEM262L Lab Manual for Fall 2019 available only from UNC Student Stores through the first day program. Package will include an e-book access code and a form required for lab check-in.
- 3) Making the Connections by Anne B. Padias; Hayden McNeil Publishing; first, second, or third edition
- 4) Lab notebook – must meet the following criteria: bound, consecutively numbered pages, and carbonless duplicate pages. Can be purchased from Alpha Chi Sigma (ΑΧΣ) chemistry fraternity in Morehead Labs during check-in or from the UNC Student Stores.

ATTENDANCE: Attendance in lab is mandatory. If you are more than 30 minutes late to lab, it will be treated as an absence. You are not permitted to begin experimentation if you are more than 30 minutes late to lab. *Only Dr. Zurcher can excuse absences for CHEM262L.* Lab absences are not automatically excused. Each absence is evaluated on a case by case basis; therefore, do not assume your absence will be excused.

In case of serious illness, accident, or family emergency that causes you to miss your regularly scheduled lab section, email Dr. Zurcher and your TA as soon as you are able. If a Dean or Advisor is assisting you with a serious situation, they may email your instructors about your absence.

Missing more than one lab period, excused or unexcused, will result in an automatic F for the course.

ASSIGNMENTS: Quizzes, lab reports, NMR assignments, and a research summary are due as posted on Sakai. There are no make-up quizzes and quizzes are not accepted after the deadline. You can visit office hours for either CHEM262L TA to request assistance with your lab reports, NMR assignments, and research summary. Office hours will be held on throughout the week and are posted on Sakai. Any lab report, NMR assignment, or research summary not submitted within 48 hours of the initial deadline will not be accepted. **Mandatory penalties apply to late assignments,** regardless of the cause for tardy submission. All lab reports will be submitted to Gradescope.

How late is your assignment?	Penalty
< 15 min	Loss of 10% of possible points
15 min – 8 hours	Loss of 25% of possible points
8 – 48 hours	Loss of 50% of possible points
More than 48 hours	No credit

GRADING:

Quizzes (10)	10%
Pre-lab notebook (9)	5%
Post lab notebook (4)	5%
NMR assignments (3)	10%
Lab reports (3)	22%
Daily TA evaluations (9)	5%
*Mid-term exam (Exp 1-3)	10%
Research summary (3)	<u>33%</u>
	100%

* If you are registered with ARS and have exam accommodations, this information must be emailed to Dr. Zurcher *on or before September 9th.*

Final letter grades for the course will be determined based on the percentage of points you earned and your standing within your section.

	B+	87-89.99	C+	77-79.99	D	60-69.99	
A	93-100	B	83-86.99	C	73-76.99	F	below 60
A-	90-92.99	B-	80-82.99	C-	70-72.99		

The Department of Chemistry values the perspectives of individuals from all backgrounds reflecting the diversity of our students. We broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. We strive to make laboratories, classrooms, and this department an inclusive space for all students.

EXPERIMENT SCHEDULE: The complete schedule with assignments and quizzes will be posted on Sakai. Below is an overview. Dr. Zurcher reserves the right to make changes to the syllabus, including assignment due dates and test dates. Any changes will be announced as early as possible.

EXPERIMENT and INSTRUMENT *tentative* SCHEDULE

	NO LABS
Aug 19-23	
Aug 26 - 30	Check-in in Chapman 211 Workshop
Sept 2-6	No Labs
Sept 9-13	Exp 1
Sept 16-20	Exp 2 NMR and mp of aspirin
Sept 23-27	Exp 3-1 UV-Vis and NMR of cinnamate ester
Sept 30 – Oct 4	Exp 3-2
Oct 7 -11	<i>Mid-term exam in CHAP 211</i> Research - chalcone synthesis
Oct 14 - 18	NO LABS
Oct 21-25	Research 1 –pyrylium synthesis NMR of chalcone
Oct 28-Nov 1	Research 2 – <i>writing workshop in CHAP 211</i> UV-Vis, fluorescence, and NMR of pyrylium
Nov 4-8	Research 3 – repeat pyrylium synthesis CV of pyrylium
Nov 11-15	Research – oxidation of an alcohol using pyrylium and NMR of mixture
Nov 18-22	<i>checkout</i> <i>Paper review and editing in CHAP211</i>
Nov 23-26	NO LAB