

# CHEM262L: Organic Chemistry Laboratory



FALL 2018 All sections

Chapman 125 classroom and Morehead Labs 300, 301, and 303

**Instructor:** Nita A. Eskew, Ph.D.

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**Office Hours:** Tuesdays 10:30-11:30 am. If you cannot make this time, please request an appointment.

**Office:** 239 Caudill Labs

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**Lab Supervisor:** Kathleen Nevins

**Office:** Morehead Labs 206

**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, GC, UV-Vis, CV, fluorescence, 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.

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*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 Consultant, Natalie Holmberg-Douglas, Carla Morton and/or Tim Fazekas and he/she will assist you in the research project. The GRC program is sponsored by the Office for Undergraduate Research ([our.unc.edu](http://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

Wittig reaction

Electrophilic Aromatic Substitution

Dehydration of an alcohol

Aldol condensation

Michael reaction

Oxidation of an alcohol

**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 vii 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 your scheduled lab period in the week of August 27. 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 Sept. 9, 1977:

*“Since all graded work (including homework to be collected, quizzes, papers, mid-term examinations, final examinations, research proposals, laboratory results, and laboratory 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 <https://studentconduct.unc.edu/>.

The guiding principle of academic integrity is that **the work submitted by a student must be that student's own independent 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 that are described below. Misunderstandings of academic integrity can

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also arise when citing 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, a website) that is not properly referenced constitutes a violation of academic integrity. In all cases when you work with other students, you must clearly indicate who your partner or partners were.

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

- Unauthorized collaboration
- Plagiarism
- Cheating – Unauthorized access to lab materials
- Violating procedures pertaining to the academic process

## UNAUTHORIZED COLLABORATION

**Note:** Unauthorized collaboration is defined differently for each laboratory course. Please read the following points developed to define what constitutes unauthorized collaboration.

- **When writing up your pre-lab and lab report, there is no collaborative work.** You must write your own report, answer questions in your own words, and work up your own data. If you are having difficulties or have questions, you should see your TA or instructor for help.
  - **Laboratory Data and Observations.** You and your lab partner are expected to enter data and observations directly into your Lab Notebook during the experimental procedure.
  - **Laboratory Report.** All lab reports must be written independently. During this laboratory course, you will be working with a lab partner on all experiments. *However, the work that you submit for a grade must reflect your own unique interpretation of the experiment and expression of your conclusions.*
    - Your report must be substantively different from any other report on the same experiment, including that of your lab partner(s).
    - When reporting observations collected together, be sure to add sufficient individual value to those observations so that your unique contribution is clear and distinct.
    - Always build your own understanding and convey concepts, ideas, and observations in your own words.
    - When reports contain elements that are too similar to judge the individual contributions of each author, the grade will be based only on those elements that are clearly distinct in each report. Common material will not be included in the grade. If the similarities are too great, the authors will both be charged with Unauthorized Collaboration.
    - *Never share your written work with another student to use as their own, or to inform their own.* Do not allow your lab partner or other students to have access to your lab reports. This applies even if you took the course in a previous semester. While it may seem helpful, it can lead to violations of the Honor Code in which both students face consequences.

## PLAGIARISM

- Using someone else's words or ideas without giving credit for their work is called plagiarism. The ideas presented in your report must be your own. If you present anyone else's ideas or work as your own, this is plagiarism.
  - Rearranging the words from a source to make them seem like your own words is a type of plagiarism known as an improper paraphrase. Any paraphrase still needs a proper citation.

- **Self-plagiarism:** Using a direct quote from your own earlier work without attribution in a separate document can be considered self-plagiarism. You are essentially presenting the same intellectual work twice for credit.
- **External Sources:** You may present facts from an outside source, as long as you properly reference the source with both an in-text citation and a full reference at the end of your document.
  - The lab manual for your course and semester should be considered an external source. Whenever you refer to the procedures and information provided in that document, you should include a citation. (Whenever possible, avoid direct quotes from the lab manual, as this represents little to no individual contribution to your report.)
  - For more guidance on correct citations and advice on avoiding plagiarism or improper paraphrasing, please see the Library Resource page on the course website, or consult a TA, peer mentor, librarian, or the instructor.

## **CHEATING – UNAUTHORIZED ACCESS TO LAB MATERIALS**

- Any use of lab reports or lab manuals from previous semesters constitutes a violation of the Honor Code.

## **VIOLATING PROCEDURES PERTAINING TO THE ACADEMIC PROCESS**

- Providing lab reports, quiz/exam questions, or any graded laboratory material such that it might be distributed to others (in person, electronically, or via online platforms), or using resources acquired from such sources, is not permitted.

*Approved by the Undergraduate Labs Committee, February 2018*

***One additional note: 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 2018 available only from UNC Student Stores. 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 (AXΣ) 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. Eskew 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.

What should I do if I cannot make it to my scheduled lab section or if I have missed lab? If you have a UNC sanctioned event (research presentation at a professional conference, concert, varsity sports competition, performance, etc.) that conflicts with your regularly scheduled lab section, email Dr. Eskew at the beginning of the semester and provide the event, date and time, and instructor/coach contact information.

In case of serious illness, accident, or family emergency that causes you to miss your regularly scheduled lab section, email Dr. Eskew 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.

Typically, only one lab absence is excused during a semester. Missing more than two lab experiments, excused or unexcused, will result in an automatic F for the course. If you have an absence that has been excused by Dr. Eskew, you will be given the opportunity to **make up the lab on a Friday of a following week from 1:25 - 4 pm** for the experiment you missed.

**ASSIGNMENTS:** Quizzes, lab reports, NMR assignments, and research summaries 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 any CHEM262L TA to request assistance with your lab reports, NMR assignments, and research summary. The office hours schedule is 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.

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 (10)	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. Eskew *before October 1.*

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	C+ 77-79		F below 60
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A 93-100	B 83-86	C 73-76	D 60-69	
A- 90-92	B- 80-82	C- 70-72		

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. Eskew 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

WEEK OF	
AUGUST 20	NO LABS
AUGUST 27	Check-in in Chapman 125 Workshop
SEPTEMBER 3	NO LABS
SEPTEMBER 10	Exp 1
SEPTEMBER 17	Exp 2 NMR and mp of aspirin
SEPTEMBER 24	Exp 3-1 UV-Vis and NMR of cinnamate ester
OCTOBER 1	Exp 3-2
OCTOBER 8	<i>Mid-term exam in CHAP 125</i> Research - chalcone synthesis
OCTOBER 15	NO LABS
OCTOBER 22	Research –pyrylium synthesis NMR of chalcone
OCTOBER 29	Research – <i>writing workshop in CHAP 211</i> UV-Vis, fluorescence, and NMR of pyrylium
NOVEMBER 5	Research – repeat pyrylium synthesis CV of pyrylium
NOVEMBER 12	Research – oxidation of an alcohol using pyrylium and NMR of mixture
NOVEMBER 19	NO LABS
NOVEMBER 26	<i>Paper review and editing in CHAP 125</i>
<b>Tuesday, Dec. 4 from 3-5 pm</b>	<b>QEP Research and Maker Expo Great Hall</b>