

# APPLES

## CHEM290 - The Chemistry of Purslane

Fall 2017 Fridays 1:25-4:15 pm  
Murray G201 and 300 Morehead Labs

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**Office Hours:** Thursdays 10:30-11:30 am in Caudill 239. If you cannot make this time, please request an appointment.

**Lab Supervisor:** Mark Koza

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**COURSE DESCRIPTION:** This is an APPLES service-learning course that partners with the Carolina Campus Community Garden (CCCG). Students will work in the garden to plant, care for, and/or harvest purslane (*Portulaca oleracea*), an edible medicinal plant, depending on the season. In the lab, partners will work together to analyze the concentrations of antioxidants in harvested purslane. A variety of lab techniques will be used, including extraction and UV-Vis spectroscopy. Students will keep a journal for reflection of their service work, and a lab notebook will be used for recording all experimentation. At the end of the semester, each student will write a summary paper, and teams will prepare and present research posters describing their projects. Our findings will be shared with the CCCG.

**COURSE OBJECTIVES:** As a Course-Based Undergraduate Research Experience (CURE), 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 Campus Community Garden

*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.

### TOPICS COVERED:

Role of the Carolina Campus Community Garden

Overview of medicinal plants

The nutritional role of antioxidants

Antioxidants in plants

Reduction reactions using plant enzymes

Library instruction on researching and data literacy best practices

Extraction techniques

UV-Vis spectroscopy

**SERVICE HOURS:** A minimum of 30 hours during the semester are required. Approximately seven afternoons will be dedicated to class time spent in the lab and/or in the Carolina Campus Community Garden. Additional hours will be completed by the students volunteering in the garden.

**PREREQUISITES:** In order to be enrolled in this course, you must have completed CHEM241L.

**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 Undergraduate Laboratories Safety Rules as outlined Sakai. 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.

## **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.

An 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.

**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 notebooks and posters, 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 ask if you need any assistance.

### **REQUIRED COURSE MATERIALS: (\* required in lab)**

- 1) \* Approved safety goggles – you can purchase goggles using your ONE card
- 2) Making the Connections<sup>2</sup> by Anne B. Padias; Hayden McNeil Publishing; first, second, or third edition
- 3) Lab notebook – must meet the following criteria: bound, consecutively numbered pages, and carbonless duplicate pages. Can be purchased from Alpha Chi Sigma (AXS) chemistry fraternity in Morehead Labs during check-in or from the UNC Student Stores.
- 4) Recommended: Understanding Medicinal Plants by Bryan Hanson; ISBN-13: 978-0-7890-1552-5.

**ATTENDANCE: Attendance in lab and class is mandatory.** If you are more than 30 minutes late, it will be treated as an absence. You will not be permitted to begin experimentation if you are more than 30 minutes late to lab.

*Only Dr. Eskew can excuse absences.* 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. 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.

Only two absences can be excused. Missing three or more class periods, excused or unexcused, will result in an automatic F for the course. There are no make-up class periods.

**ASSIGNMENTS:** Written assignments, lab notebooks, research summaries, research poster, and your reflection journal entries are due as posted on Sakai. Assignments submitted after the deadline will be penalized. Up to 24 h past the deadline will result in a loss of 20% of the possible points. Between 24 - 48 h past the deadline will result in a loss of 40% of the possible points. No assignments will be accepted after 48 h.

**GRADING:**

Written assignments	10%
Team participation	10%
Lab notebook	10%
Reflection journal	10%
Research summaries	25%
Research poster	<u>35%</u>
	100%

The letter grades for the course will be determined based on the percentage of points you earned and will be assigned as follows:

	B+ 87-89	C+ 77-79		F below 60
A 93-100	B 83-86	C 73-76	D 60-69	
A- 90-92	B- 80-82	C- 70-72		

**TENTATIVE SCHEDULE** Dr. Eskew reserves the right to make changes to the syllabus, including test dates. Any changes will be announced as early as possible.

WEEK	DATE	
1	8/25	Introduction; CURE survey; Antioxidant and purslane chemistry overview; visit growing locations
2	9/1	Literature searching and poster design. "What is service-learning?" Set up volunteer schedules; visit CCCG Ms.Bender at 2 pm Ms. Lorch at 2:30 pm
3	9/8	Team planning – prepare research questions and procedures; team contract and expectations; plant purslane seeds in greenhouse
4	9/15	Lab work – grind (for two samples), extract, centrifuge plant material; freeze extracts
5	9/22	Lab work – purification and separation
6	9/29	Lab work – oxidation tests with a control ( $\alpha$ -tocopherol)
7	10/6	Lab work – oxidation tests with extract
8	10/13	Repeat week 4; MS of extract
9	10/27	Repeat week 5; MS of extract, if needed
10	11/3	Repeat week 7
11	11/10	Repeat any lab work, as needed; poster preparation
12	11/17	Poster review and peer feedback
13	12/1	Poster session; CURE and team surveys

Nita Eskew is a Service-Learning Course Development Grant recipient through the Carolina Center for Public Service at UNC-Chapel Hill.