

**Plant Ecology**  
**Syllabus Lecture and Lab**  
**Fall 2016**  
**BIOL 444**  
**BIOL LAB 444**

**Dr. Courtney Murren**

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**Office:** SSMB 144

**Phone:** 953-8077

**Office Hours:** by appointment via email and Tuesday 1-2pm

**Class hours:** 1-2:15 M and W

SSMB 200

**Lab** W 2:25-5:25 SSMB 200 as well as Field, and Greenhouse

**Description of Course:** Plant ecology is an advanced course for **undergraduates**, which will combine lecture, lab and discussion. We will be exploring a range of topics including examining theoretical foundations and current controversies in plant ecology. Our emphasis is on terrestrial plant ecology, but with some marine and coastal systems thrown in. We will gain an understanding of ecological theory, links to evolutionary and conservation biology and familiarize you with some experimental, methodological, and statistical techniques, and literature. Each week will be a different topic, although you will notice as time passes, that many topics are inter-related. Each class we will have half for lecture of a topic, and half for paper discussion. For each discussion, I will choose a classic or very recent paper on the topic (although some topics will have only recent papers). Each student will be asked to lead discussions during the semester (either alone or in pairs).

Undergraduate Learning Objectives and outcomes:

Learning Objectives:

- learn theoretical framework of general ecology and specific contributions plant ecology
- describe links to evolutionary ecology and conservation ecology
- summarize population ecology and community ecology concepts.
- read and practice methods employed in plant ecology
- read and analyze peer reviewed literature

Learning outcomes:

- practice field techniques, and greenhouse techniques in plant ecology.
- practice observational, natural and manipulative experiments
- develop critical thinking, analysis, and writing skills as they apply to plant ecology
- develop hypotheses based on scholarly reading
- review literature through discussion with classmates
- test hypotheses through experimental work as professional plant ecologists
- review primary literature and summarize in a body of work
- explain topics in through oral presentation and interpret through modern lens
- report newly acquired data in oral and written form.

**Text:** *The Ecology of Plants Second Edition* by Gurevitch, Scheiner, and Fox. Sinauer Assoc. Inc, Publishers. Sunderland, MA. (Note: the second edition is required) the publisher at <http://www.sinauer.com/>

**Discussion readings:** PDF of scholarly articles posted on OAKS

**Course pre-requisites:** BIOL341, or per instructor with 300 level course work such as Botany, Entomology, Evolution, Plant Physiology.

\*The syllabus is **subject to change**, any changes will be announced in lecture. See below for tentative lab schedule – assignment due dates are listed above.

Learning Objectives:

- exposure to theoretical framework of general ecology and identify specific contributions plant ecology
- exposure to evolutionary ecology and conservation ecology as it pertains to plant ecology
- apply principles of population ecology and community ecology.
- practice methods employed in plant ecology
- discuss links with other sub-disciplines
- report on findings in peer reviewed literature

Learning outcomes:

- practice field techniques, and greenhouse techniques in plant ecology.
- practice observational, natural and manipulative experiments
- develop critical thinking, analysis, and writing skills as they apply to plant ecology
- employ hypotheses based on scholarly reading
- describe literature through discussion with classmates
- formulate and test hypotheses through experimental work in plant ecology
- write about and discuss primary literature
- explain topics in through oral presentation and interpret through modern lens
- describe newly acquired data with published data

**Text:** *The Ecology of Plants Second Edition* by Gurevitch, Scheiner, and Fox. Sinauer Assoc. Inc, Publishers. Sunderland, MA. (Note: the second edition is required) the publisher at <http://www.sinauer.com/> also available at other online vendors.  
 Discussion readings: Check out OAKS for PDFS

<b><u>Week 1</u></b>	<b><u>Habitat Heterogeneity</u></b>		<b><u>Written Work Due Dates</u></b>
W, Aug. 24	Intro to Plant Ecology and plant responses to environment	Ch 1. pp. 9-11, 36-41, 71-80	
W,	No lab this week		
<b><u>Week 2</u></b>	<b><u>Process of Evolution in an Ecological Context</u></b>		
M, Aug 29	Ecotypes & Structured populations	Chapter 6	
W, Aug 31	Discussion 1		
W, Lab 1	Field		
<b><u>Week 3</u></b>	<b><u>Outcomes of Evolution</u></b>		
M, Sept. 5	Phenotypic Plasticity & Habitat Heterogeneity	Chapter 6	Paper topics due subject to approval Pollination/morphology Field lab results due
W, Sept. 7	Discussion 2		
W, Lab	GH/Downtown Urban		
<b><u>Week 4</u></b>	<b><u>Population Structure, Growth &amp; Decline</u></b>		
M, Sept. 12	Population Growth & Life Cycles	Chapter 5	
W, Sept. 14	Discussion 3		
W, Lab	GH/Downtown Urban		
<b><u>Week 5</u></b>	<b><u>Reproduction and Mutualism</u></b>		
M, Sept. 19	Reproductive ecology	Chapter 7	Bibliography & Outline Due
W, Sept. 21	Discussion 4		
W, Lab	Field		
<b><u>Week 6</u></b>	<b><u>Breeding &amp; Mating systems and Dispersal</u></b>		
M, Sept. 26	Breeding & Mating systems	Chapter 7	Dune ecology write up
W, Sept. 28	Discussion 5		Hand out of mid-term questions
W, Lab	GH		
<b><u>Week 7</u></b>	<b><u>Life History</u></b>		Draft of paper due

M, Oct, 3	Dispersal & Life History Strategies	Chapter 8	<b>No Extensions</b> (your classmates review your work! Think of them)
W, Oct. 5	Discussion 6		
W, Lab	GH		
<b><u>Week 8</u></b>	<b><u>Species Interactions</u></b>		
M, Oct. 10	Competition	Chapter 10	
W, Oct. 12	<b>Midterm Exam</b>		<b>Midterm Exam</b>
W, Lab	Field		
<b><u>Week 9</u></b>	<b><u>Species Interactions</u></b>		
M Oct. 17	Herbivory	Chapter 11	
W, Oct. 19	Discussion 7		Reviewer's comments due
W, Lab	Mixed GH/Computers		
<b><u>Week 10</u></b>	<b><u>Communities</u></b>		
M, Oct. 24	Species interactions & communities	Chapter 10,9	Solidago results due
W, Oct. 26	Discussion 8		
W, Lab	Field		
<b><u>Week 11</u></b>	<b><u>Disturbance and Succession</u></b>		
M, Oct 31	Succession & Disturbance	Chapter 12	Germination report due
W, Nov. 2	Discussion 9		
W, Lab	Field		
<b><u>Week 12</u></b>	<b><u>Conservation Ecology</u></b>		
M, Nov. 7	<i>FALL BREAK - no class</i>		
W, Nov. 9	Ecology of Invasive Species	Chapter 13	
W, Lab	Field/lab/computers		
<b><u>Week 13</u></b>	<b><u>Landscapes</u></b>		
M, Nov. 14	Communities in Landscapes	Chapter 15	Final Paper Due
W, Nov. 16	Discussion 10		
W, Lab	GH		
<b><u>Week 14</u></b>	<b><u>Student Presentations</u></b>		
M, Nov. 21	<i>Presentations</i>		Final Exam Hand Out
W, Nov 23	<b>Thanksgiving break</b>		
<b><u>Week 15 &amp; 16</u></b>	<b><u>Presentations and Global Patterns</u></b>		
M, Nov 28	<i>Presentations</i>		
W, Nov 30	<i>Presentations Semester wrap up and global patterns</i>		
W Lab	<i>Lab: computers &amp; GH cleanup</i>		
Tu, Dec 5	<i>Student review and synthesis session</i>		<i>Brassicaceae lab due Urban Ecology lab due</i>

W, Dec 6	<b>Reading day</b>	
F, Dec. 9, 12-3 pm	<b>Final Exam – same room as lecture</b>	<b>Final Exam</b>

**Grades will be based on the following work:**

**Undergraduates:** Midterm Exam, 50 Pts. Final Exam, 100 Pts. Presentation/Participation in Class Discussions, 100 Pts. Lab Participation/Lab peer review and Written Lab work, 150 Pts. Review of Colleague’s Paper, 50 Pts. Draft Paper and Final Paper, 100 Pts.

The grading system:

Grades for Undergraduate Students: 95% A (4), 92-94% A- (3.7), 88-91% B+ (3.3), 84-87% B (3.0), 80-83% B- (2.7), 77-79% C+ (2.3), 74-76% C (2.0), 70-73% C- (1.7), 67-69% D+ (1.3), 64-66% D (1.0), 60-63% D- (0.7), below 60% F (0.0)

**Components of the Course:**

**Lecture:** I will lecture on topics relating to the theme for the week including theoretical underpinnings of ideas, history of ideas, and current controversies. Come prepared having read the text for background, and be prepared to ask questions. We'll break out for discussion and critical thinking exercises.

**Discussion:** During the semester, we will discuss primary literature. These are journal articles that I have chosen in advance. For each discussion, we will examine a pair of papers from the primary literature. Each student will lead discussion with a partner during the semester. **On the week that you lead with your partner, you will prepare a one page type-written (10 or 12 pt font, double spaced) essay.** This brief essay will include four main elements/paragraphs: 1 & 2) your own brief summary one paragraph for each paper, 3) how the recent paper relates to the classic paper, and 4) your view of the papers. You should copy your summaries for other members of the class and hand them out at the beginning of class.

For every discussion, all students (including presenter) will prepare four thoughtful questions with associated text, and type them, print them, and bring them to class. You will use them in class as points of discussion, and I will collect them at the end of class. By thoughtful question and associated text, I mean: Example 1: “How does the split block design affect this experiment? I understand that the author set up two treatments, water and light, but I don’t understand how the split block is set up. Is it that each tray of plants either receives a specific level of the water treatment rather than an individual plant receiving the treatment?” Example 2: “Does the author actually detect selection? I note on page 100 that the author asserts that they find directional selection. However in Table 1 on page 98, there is no significant term suggesting natural selection”.

**Exams:** There will be a Mid-Term exam and a Final Exam. The mid-term exam will be related to the lecture and discussions for that section of the course. The final exam will be cumulative and will also include material from the laboratory exercises. The exams will be essay type, and the

questions are intended to practice reviewing across topic and critical thinking. They are intended to be a fun thought exercise as well as a way to assess your understanding of the material.

**Lab participation and Written Labs:** Wear appropriate attire to lab: including **closed toe shoes**. Bring appropriate anti-insect medical needs and water for field trips. Do not miss lab, you cannot make it up. No smoking on field trips. Please turn silent cell phones during lab and do not use text messaging capabilities during instruction/work times. Follow safety manual. Bring a composition type notebook for field notes and GH notes.

Labs will involve field work, greenhouse work, lab measurements, statistical analyses, and write ups. Labs will focus on hypothesis testing. We will plan to do manipulative experiments, natural experiments and observational experiments. We will have formal lab exercises requiring written work. Some lab exercises will have a written report that will be in the form of a journal article, others will have shorter form writing assignments. More details on this in lab. Lab participation and peer review will factor into your final grade.

**Final Paper:** Undergraduates will write a short **review** paper. Formal details to follow.

Final papers will be subject to “peer review”. Three weeks before the final paper is due, I will assign student partners who will review papers. The reviewer takes the paper for one week. Students will edit the paper carefully for typos, grammatical problems, etc. The reviewer will write a formal review (in the same manner that all scientists do for journal articles of their peers). A formal review will summarize the logic of the paper (if the summary departs significantly from the author’s intent, the author will have a strong message that his/her point was not clear). The review will address quality of writing, logic of argument, will highlight both good and weak points, and summarize the message of the paper in a single sentence. The reviewer will make specific recommendations for improvements. After a week, all students will get their drafts back, with the reviewer’s comments. Students should feel free to meet with each other to discuss if the review is unclear. The final draft will be due two weeks later, at which point the original draft and the review will also be handed in together with the final paper. I will look over the review for thoroughness, thoughtfulness and professionalism. The writer will be evaluated on the quality of the paper, as well as the responses to the peer review editor’s comments (incorporating suggestions and corrections). Any major objections to the reviewer’s comments should be discussed with the reviewer and me. This process is intended both to encourage students to interact without competition, as well as expose students to the process that professional scientists follow for editing and communicating suggestions. You will also benefit by reading a paper in another subject, as well as the process of examining a topic in depth. As a way to share what you have learned in your written paper with the class, we will dedicate time to brief presentations.

**College Required Syllabus Material**

1. **Center for Student Learning:** I encourage you to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies, speaking & writing strategies, and course content. They offer tutoring, Supplemental Instruction, study strategy appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career and the services are available to you at no additional cost. For more information regarding these services please visit the CSL website at <http://csl.cofc.edu> or call (843)953-5635.
  
2. **Center for Disability Services (<http://disabilityservices.cofc.edu/for-faculty/faqs.php>)**
  - Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged.
  - The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsible for notifying me as soon as possible and for contacting me one week before accommodation is needed.
  - This College abides by section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, please see an administrator at the Center of Disability Services/SNAP, 843.953.1431 or me so that such accommodation may be arranged.

### **3. College of Charleston Honor Code and Academic Integrity**

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the instructor determines the student's actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying

from others' exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor. Students can find the complete Honor Code and all related processes in the Student Handbook at <http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>



**Laboratory syllabus: Tentative Lab Schedule:**

**(Subject to change: Dependent on plant phenology, and sometimes weather)**

Aug 24, 2016 Seeds to gh, safety, waiver

V Aug 31, 2016 Observational Experiment: Pollination Plant Morphological Ecology: Grice Field

Sept 7, 2016 Manipulative Experiment: Transplant Brassicaceae: Greenhouse Or Urban Ecology  
Downtown campus

Sept 14, 2016 Manipulative Experiment: Transplant Brassicaceae: Greenhouse Or Urban  
Ecology Downtown campus + germination planning

V Sept. 21, 2016 Observational Experiment: Dune Ecology

Sept. 28, 2016 Manipulative Experiment: Germination week 1: Greenhouse

Oct. 5, 2016 Brassicaceae experiment: early developmental characters: Greenhouse

V Oct. 12, 2016 Observational Experiment: Solidago Caw Caw : Field

Oct. 19, 2016 Germination week 2, Data Management, Statistics lab.

V Oct. 26, 2016 Urban Root ecology: USDA

V Nov 2, 2016 Urban Root Ecology: Dixie

Nov. 9, 2016 Urban Ecology: Campus/Grice or lab measurements

Nov. 16, 2016 *Brassicaceae* finalizing experiment – lab/GH

Nov. 23 - *no lab Thanksgiving break*

Nov. 30, 2016 Computer lab – last lab

V=van from Addlestone Library