Biology 341: General Ecology  
Course Syllabus Fall 2019  
Phillip Dustan

Introduction:
Ecology embraces many aspects of all other biological and physical sciences. It is truly an open-ended field of study. In this particular course we shall focus on the biology of ecology and its politics will undoubtedly creep in. We shall explore the abiotic (physical factors) of the earth that set the stage for the structure of ecosystems. Then we shall examine communities, and the fundamentals of population biology: the evolution, growth, and regulation of populations in nature. The course will finish with the concepts of community ecology and global ecology.

The laboratory will be a combination of natural history, field trips and a project (1 to 3 people). You will be expected to keep a journal describing your experiences on field trips and field work. For many of you this may be your first experience in field biology. Buy a bound composition book, be sure to wear field clothes and be prepared to get your hands dirty, capture bugs, and learn how to avoid poison ivy, and to think and do experiments in Nature. Special precautions should be taken against insect bites, especially ticks and mosquitoes which may carry Lyme disease or West Nile Virus.

The learning outcomes of this class include understanding:
1. How abiotic forcing functions control the distribution of biodiversity on Earth.
2. The principles of biogeochemistry; the interaction of organisms with their chemical environment.
3. The flow of energy and molecules through ecosystems: terrestrial vs oceanic communities
4. The role density dependent vs density independent control in the growth and regulation of populations.
5. The mathematics describing the growth and regulation of populations of living organisms
6. The theory of species diversity.
7. How to make and document ecological field observations

Critical Thinking:
Critical thinking is the common denominator between all forms of analysis. As a "college or university student, there is no more important goal than that of developing your mind, as everything you do in your life will be affected by your mind and how it operates. The quality of your learning is affected by the quality of your thinking about learning. The quality of your personal relationships is affected by the quality of your thinking about those relationships. To take command of the thinking that controls your life, you must cultivate your intellect". (Refer to www.criticalthinking.org)

Honor Code: All class work must be your own original work and must not have been submitted for a grade in any other class while at the College of Charleston or elsewhere. Furthermore, no project done in this class may be submitted for grading in any other present or future course. To do so will be construed as a clear violation of the Honor Code. More information can be found in the Student Handbook at http://www.cofc.edu/generaldocuments/handbook.pdf and page 3.

Absences: I adhere to the College of Charleston Absence Policy as stated in the Student Handbook. If you miss a lecture be sure to get the notes from another student. If you miss an exam I expect you to present me with a Dean’s excuse or other acceptable documentation. If you miss a lab be prepared to make up the experience and entry in your lab book.

Course requirements:
Lecture: Three (3) class exams, one original research paper and one final exam = 75% of grade
Laboratory: Field Laboratory Notebook and original research project (presentation and written report) = 25% of grade
Term Paper: You are required to complete a term paper. Your topic MUST be discussed with me before you begin or you will not be given credit for the work. The grade you receive for this work will carry the weight of an in-class examination. An outline of your paper is due on October 29, 2019 and the final paper is due at the start of class on November 7, 2019 without exception.

Science is an ongoing progression of ideas built on previous work. Your assignment is to report on the current state of knowledge of an ecological or evolutionary process of your choosing, NOT a thing or an organism, but an actual Ecological or Evolutionary Process. You may not write a paper on global warming, sharks, coral bleaching, beach erosion, or any other topic dealing with pollution or man's impact on the Biosphere. Start your project by finding a paper in the recent peer-reviewed scientific literature that is central to your interest. Then research the topic using other papers from the literature. After you have done some reading on your chosen topic make an appointment to discuss it me. The paper should be at least 2500 words of text, cite a minimum of 10 peer-reviewed papers plus any other references you choose to use, and must be typed (Times Roman font, 11 or 12 pica, double spaced). Submit both paper copy and email electronic copy.
Filename = YOUR LAST NAME_PAPER_B341F2019.DOC).
Laboratory components:

1. **Laboratory notebook** demonstrating day to day work and participation in laboratory and an active knowledge of the scientific method (see Laboratory Field Trips below). This is due in class on November 20, 2019. **Please dress for the weather and you must wear closed shoes on field trips. You will not be allowed to participate if you wear sandals, crocs, flip flops, Tevas, etc. Use of tobacco products are not permitted on field trips and cell phones only in the van.**

2. **Original research project** carried out with 1 to 3 people. Results will be reported in writing and as an oral presentation. Grading will be based on your question, methods, data, a written report, and a presentation to your peers.

3. **Laboratory Field Trips:**
   We will be visiting a number of habitats, mostly forest ecosystems, during the course of the semester. A significant part of your lab grade will be based on the quality of your laboratory notebook, a journal which documents your participation in lab and shows me that you observed some aspect of nature. There are three parts to a laboratory report:
   
   1. The first part of a lab report should consist of your field notes written in your notebook while on the trip. These will obviously be rough notes jotted down “on the fly”
   2. The second section of a report should be a detailed summary of the field trip using field notes and other information. (where, what, description, species lists, photographs, etc). This should be written every week before the next lab (approximately 250-400+ words).
   3. The third part is a short report based on your observations and peer reviewed literature which discusses some ecological process that was encountered on the trip, succession, zonation, competition, predation, life history of a curious animal or plant, etc. This should be written every week before the next lab (approximately 400-800+ words and documented with literature citations).

4. **Laboratory Project:**
   The second half of the semester laboratory is devoted to a field project done individually or in a team of two or three people. I want you to experience the process of creating and implementing an ecological field project in which you and your team (3 or less) generate a question that can be answered by collecting field data, and then presented to your peers. The Lowcountry is ripe for research on the impact of development, flooding, road and aquatic microplastic pollution, and water quality, but you may also have another interest that you would like to pursue. Hopefully, our early field trips will provide you with a framework within which to develop your ideas. We have a wide variety of gear and instrumentation that you may use to collect data in addition to other departmental resources. Your field project notes and data/data file names must be kept in your notebook.

**IMPORTANT**: Your notebook **MUST be a hardbound notebook** (i.e. Gradeschool marbled finish type, NO spiralbound) and you must bring it on all fieldtrips. Your field notes **MUST be hand written**, Field trip summary and short reports may be handwritten or typed. The reports **MUST be in sequence with the three sections comprising a lab report** for the week’s outing with no more than one page between reports. I expect that you will do the above assignments within a week of the fieldtrip. The format of typed pages **MUST fit the page size of your notebook and must be permanently mounted to pages** in the notebook in the proper order as described above or you will not get credit for the notebook. It is due on or before **October 29, 2019** at the start of lecture.

**GRADES CHECK LIST:**

- 1 Three In-Class Tests
- 2. One Term paper – pick your topic, meet with me
- 3. One Lab Book
- 4. One Lab Project with group presentation and one individual report due at time of presentation
- 5. Complete Final Exam

**Reading List:** There will be an optional reading packet available from Saso-Ink on Calhoun St.


**Office Hours:**

- Tues/Thurs 1050 to 12, or by appointment. (Please do not disturb me just before class unless it is critical)
- Rita Hollings Science Center: Office 223, Lab 270
- Email – phil.dustan@gmail.com
- Phone: 843-953-8086 (office) (843) 224-3321 (mobile)
Policy on electronic devices: All cell phones/pda/laptops computers, and other portable electronic devices may be used during class and laboratory hours as long as they do not disturb anyone in the class. No such devices may be on during examinations. You may be asked to leave the classroom if your phone goes off or you text excessively during class. Devices are not permitted to be used for talk, text, messaging of any kind on field trips once outside of the vans.

Grading Policy: The grading policy for this course:

- A : 92-100 excellent and creative
- B+ : 86-89 very good
- C+ : 76-79 fair
- D+ : 68-69 passing
- F : < 63 failing
- A- : 89-92
- B : 82-86 good
- C : 72-76 acceptable
- D : 65-68
- XF: Failure due to Academic Dishonesty

Final grades are supposed to reflect how much you have progressed and/or learned in the timespan of a course. With this in mind, one could suggest that an average student receives an average grade, a very good student a higher grade, and an excellent and creative student the highest grade. Course grade = .5 tests + .25 final + .20 lab + .05 participation.

Academic Support Services—The Center for Student Learning- The CSL, located on the first floor of the library, offers a wide variety of tutoring and other academic resources that support many courses offered at the College. Services include walk-in tutoring, by appointment tutoring, study strategies appointments, Peer Academic Coaching (PAC), and Supplemental Instruction (SI). All services are described and all lab schedules are posted on the CSL website http://csl.cofc.edu/ , or call 843.953.5635 for information.

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 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
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>(Ch = chapters in text, R= reading)</th>
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<tbody>
<tr>
<td>20 Aug</td>
<td>First Day: introductions, outline, viewpoints and perspectives</td>
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<tr>
<td>22 Aug</td>
<td>The Biosphere (Ch 2,3,4, R#1, R#14, R# 23)</td>
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<td>27 Aug</td>
<td>Earth: the fitness of the environment water, carbon, and light (CH 2, 3,)</td>
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<tr>
<td>29 Aug</td>
<td>Climates on a rotating Earth: solar angle, adiabatic cooling, coriolis force, biomes (Ch 2, 3)</td>
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<td>3 Sep</td>
<td>Law of tolerance, Principle of Similitude, Constraints, Periodicities (Ch 4)</td>
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<tr>
<td>5 Sep</td>
<td>Thermodynamics, ecosystem homeostasis, Law of the Minimum, Scaling</td>
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<tr>
<td>10 Sep</td>
<td>Scaling continued, Communities: definition, identity, and succession (Ch16, 17)</td>
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<tr>
<td>12 Sep</td>
<td>Productivity: theory &amp; photosynthesis and measurement(Ch 5, 20)</td>
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<tr>
<td>17 Sep</td>
<td>Ecological efficiency &amp; trophic structure Ch 21, R# 8</td>
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<td>19 Sep</td>
<td><strong>Exam #1</strong> (Aug 20 through Sept 12 Biosphere through Ecological Efficiency)</td>
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<tr>
<td>19 Sep</td>
<td>Biogeochemistry continued</td>
<td>(Autumnal Equinox is Sept. 23, 2019, at:50hrs EDT:</td>
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<td>24 Sep</td>
<td>Forest ecosystems: soils and nutrients. (Ch 22)</td>
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<td>1 Oct</td>
<td>Hubbard Brook Experimental Forest</td>
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<td>3 Oct</td>
<td>Evolutionary Ecology (Chapters 6 mostly, 7 and 8)</td>
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<td>8 Oct</td>
<td>Population Genetics- Review Mendelian Inheritance and Hardy-Weinberg Equilibrium and its consequences</td>
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<td>14-15 Oct</td>
<td>Fall Break</td>
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<td>17 Oct</td>
<td>Genetic variation and load: the cost of Natural Selection</td>
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<td>22 Oct</td>
<td>The Modern Synthesis: Evolution and speciation: or What is a species? Geographic Variation</td>
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<td>29 Oct</td>
<td><strong>Lab Books due in class</strong>*</td>
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<td>31 Oct</td>
<td><strong>Term Paper outline due in class</strong>*</td>
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<td>5 Nov</td>
<td>Population growth and regulation 2: R and K selection</td>
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<td>7 Nov</td>
<td>Species interactions: competition and predation modifications to the Logistic Equations (Ch 12, 13)</td>
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<tr>
<td>12 Nov</td>
<td>Niche theory</td>
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<tr>
<td>14 Nov</td>
<td>Island Biogeography (Ch 18)</td>
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<tr>
<td>19 Nov</td>
<td>Species Diversity (Ch 16, 19)</td>
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<td>21 Nov</td>
<td>Human Impacts on the Biosphere</td>
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<td>26 Nov</td>
<td>Last Day of Class: Global Ecology</td>
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<td>5 Dec</td>
<td>Final Exam scheduled for Thursday Dec 5 @ 8-11am room TBA</td>
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Laboratory Schedule

Lab is are scheduled W/Th in Ecology Lab (Rita 214) 1:30-5:30pm. There will be no makeup labs, but there are ways to make up the experience.

**DO NOT WEAR OPEN SHOES, SANDLES, FLIPFLOPS, CROCS, etc on field trip days. YOU WILL BE LEFT IN THE PARKING LOT IF YOU DO NOT WEAR CLOSED SHOES.** Field trips are tobacco free events and no cell phone use outside the vans please.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Destination / Activity</th>
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<tbody>
<tr>
<td>1.</td>
<td>21, 22 Aug</td>
<td>Introduction and Urban Ecology walk</td>
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<tr>
<td>2.</td>
<td>28, 29 Aug</td>
<td>Folly Beach maritime forest, beach and bridges*</td>
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<td>3.</td>
<td>4, 5 Sep</td>
<td>Santee Coastal Reserve longleaf pine forest*</td>
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<td>4.</td>
<td>11, 12 Sep</td>
<td>** Beidler Forest: old growth cypress swamp $6.00 admission charge</td>
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<td>5.</td>
<td>18, 19 Sep</td>
<td>Dixie Plantation / Stono Reserve</td>
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<td>6.</td>
<td>25, 26 Sep</td>
<td>Johns Island: Forests and Developments*</td>
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<td>7.</td>
<td>2, 3 Oct</td>
<td>Mt Pleasant Wastwater Treatment Plant*</td>
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<td>8.</td>
<td>16, 17 Oct</td>
<td>Experimental Design</td>
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<td>9.</td>
<td>23, 24 Oct</td>
<td>Project time</td>
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<tr>
<td>10.</td>
<td>30, 31 Oct</td>
<td>Project time</td>
</tr>
<tr>
<td>11.</td>
<td>6, 7 Nov</td>
<td>Project time</td>
</tr>
<tr>
<td>12.</td>
<td>13, 15 Nov</td>
<td>Project time</td>
</tr>
<tr>
<td>13.</td>
<td>20, 21 Nov</td>
<td>Project Reports: Oral reports and written papers due at time of presentation</td>
</tr>
</tbody>
</table>

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# Grading Rubrics Ecology (BIOL 341):

<table>
<thead>
<tr>
<th>Quality</th>
<th>Excellent (4)</th>
<th>Above Average (3)</th>
<th>Average (2)</th>
<th>Below Average (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question selection</strong></td>
<td>Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less explored aspects of the topic.</td>
<td>Identifies a focused and manageable/doable topic that appropriately addresses relevant aspects of the topic.</td>
<td>Identifies a topic that while manageable/doable, is too narrowly focused and leaves out relevant aspects of the topic.</td>
<td>Identifies a topic that is far too general and wide-ranging as to be manageable and doable.</td>
</tr>
<tr>
<td><strong>Existing knowledge, research, and/or views</strong></td>
<td>Synthesizes in depth information from relevant sources representing various points of view/approaches.</td>
<td>Presents in depth information from relevant sources representing various points of view/approaches.</td>
<td>Presents information from relevant sources representing limited points of view/approaches.</td>
<td>Presents information from irrelevant sources representing limited points of view/approaches.</td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td>All elements of the methodology or theoretical framework are skillfully developed.</td>
<td>Critical elements of the methodology or theoretical framework are appropriately developed however more subtle elements are ignored or unaccounted for.</td>
<td>Critical elements of the methodology or theoretical framework are missing, incorrectly developed or unfocused.</td>
<td>Inquiry design demonstrates a misunderstanding of the methodology or theoretical framework.</td>
</tr>
<tr>
<td><strong>Analysis</strong></td>
<td>Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.</td>
<td>Organizes evidence to reveal important patterns, differences, or similarities related to focus.</td>
<td>Organizes evidence but the organization is not effective in revealing important patterns, differences or similarities.</td>
<td>No apparent organization. Evidence is not used to support assertions.</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>The presentation is carefully organized and provides convincing evidence to support conclusions.</td>
<td>The presentation has a focus and provides some reasonable evidence to support conclusions.</td>
<td>There is some organization, but the speaker occasionally goes off topic. Evidence used to support conclusions is weak.</td>
<td>No apparent organization. Evidence is not used to support assertions.</td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>The content is accurate and comprehensive. Listeners are likely to gain new insights about the topic. Clear and creative graphics</td>
<td>The content is generally accurate and reasonably complete. Listeners may develop a few insights about the topic. Interesting graphics</td>
<td>The content is sometimes inaccurate or incomplete. Listeners may learn some isolated facts, but they are unlikely to gain new insights about the topic. Acceptable graphics</td>
<td>The content is inaccurate or overly general. Listeners are unlikely to learn anything or may be misled. Poor graphics</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>The speaker is professional, relaxed, and comfortable and interacts effectively with listeners.</td>
<td>The speaker is generally relaxed and comfortable. Listeners are generally recognized and understood.</td>
<td>The speaker occasionally appears anxious or uncomfortable, and may occasionally read notes, rather than speak. Listeners are often ignored or misunderstood.</td>
<td>The speaker appears anxious and uncomfortable and reads notes, rather than speaks. Listeners are ignored.</td>
</tr>
</tbody>
</table>