

BIOLOGY
211/211D-06
BIODIVERSITY, ECOLOGY AND CONSERVATION BIOLOGY
College of Charleston, Department of Biology, Fall 2018

Lecture: MWF 11:00 am to 11:50 am in RITA 102

Discussion: F 2:15 pm to 5:15 pm RITA 271

Instructor: Dr. Christopher (Chris) Freeman

Email: freemancj@cofc.edu

Office hours: M/W 9:30 am to 11:00 am or email to make an appointment

Office: RITA 204

Course Description: This course provides an understanding of how organisms interact with their environment, how organisms are related, and how humans have altered life on Earth. There are three main focal areas within the course: (1) population biology and evolution; (2) ecology at the level of a community, ecosystem, and biosphere, and (3) biodiversity and the relatedness of organisms.

Course Structure: Biological science requires you to both understand concepts and use practical skills to develop and test these concepts. This course therefore includes two components (lecture and discussion). Together these contribute to a single grade.

Lecture will introduce you to key concepts in ecology, biodiversity, and conservation biology.

Discussion will help you develop practical skills used in doing science. You will gain experience examining peer-reviewed scientific literature; organizing, visualizing, and analyzing data; using the scientific method, identifying research questions, and designing experiments; and presenting scientific information in a written proposal, a scientific poster, and an oral presentation.

Student Learning Outcomes: At the end of this course, students are expected to be able to:

- describe the processes by which populations of organisms change in size
 - discuss how interactions with the physical environment and with other organisms influence populations and communities
 - demonstrate how humans have impacted ecological systems
 - explain the forces that lead to evolutionary change within populations and diversification among species
 - interpret the evolutionary relationships depicted in phylogenetic trees
 - build a foundation of knowledge about life's diversity and its interrelatedness
 - apply ecological and evolutionary principles to the conservation of biodiversity
 - synthesize knowledge from ecology with social and/or economic systems to address conservation problems
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- apply the following professional skills: find and use primary literature, generate scientific questions and pose testable hypotheses, analyze and visualize data to evaluate hypotheses, use quantitative models to describe biological processes, and write for/present to a scientific audience

Instructional Objectives:

- review the theory of evolution, as posed by Charles Darwin.
- explore the modern view of evolution which integrates genetics, molecular biology and many other areas of biology.
- explore mechanisms (or processes) of evolution including
 - how populations evolve at the genetic level (evolutionary genetics).
 - how new species arise (speciation)
 - how biologists are revealing the way life diversified on earth and what the current “tree of life” looks like (systematics & phylogeny)
- explore the evidence in support of evolutionary theory and processes.
- explore the features of the diverse species that inhabit the planet to discover
 - the anatomical, physiological and behavioral associations between related groups of organisms
 - the contributions of the diverse groups of living organisms to ecological systems and human welfare
 - an astonishing variety of lifestyles, traits, and solutions to the challenges of life
- explore how populations change in abundance and distribution (population ecology)
- explore ecological interactions between species (community ecology)
- explore processes and changes that occur at the level of ecosystems.
- apply evolutionary and ecological concepts and theories to issues related to the conservation of biodiversity on earth (conservation biology).

Required Text and Supplies: *Biological Science* 6th edition, Freeman et al. (not me).

Download “clicker” software (**using CofC email-I will send a link**). **It should be \$14.00 for the year.**

<https://www.polleverywhere.com>

Prerequisites: Biology 111, 112 (It is advised that students earn at least a C in Biology 111 and 112 before enrolling in Biology 211). Please see me if you have concerns regarding your preparation for this course.

COURSE POLICIES

COMMUNICATION and OFFICE HOURS:

I will answer emails quickly (generally within 24 hrs during the week) and on or potentially before Monday if you send me an email after 5 pm on Friday. Email is the best way to contact me. I am here to help you however I can with this course (or with general questions/concerns) and my office hours are in place to help students, and I encourage any students that have questions to come to office hours or schedule a time to meet with me outside of class. Students that stop by to go over material on a regular basis generally earn higher grades in these classes.

OAKS and EMAIL:

(Log into <http://my.cofc.edu> and click on the link to OAKS). I will upload useful materials (lecture slides, worksheets, papers, useful links, videos, the syllabus, etc...) to OAKS. In addition, important class information and updates will be uploaded in the announcements section on OAKS. Grades will also be uploaded to OAKS so students can track their progress!!!

*All communication pertaining to the class will go through OAKS, the OAKS announcement section, or your CofC email so please check all daily.

*Students are responsible for remaining up to date with OAKS and any email correspondence.

ASSESSMENTS, and GRADING in LECTURE:

EXAMS*: The *lecture* course will be divided into three sections that each has an exam (**3 exams**). Each exam will take an entire class period.

Exams will be mostly multiple-choice questions and use a Scantron form. Students are responsible to bringing a #2 pencil to exams to use on the Scantrons. Exams may also include short answer questions.

Exam questions will be pulled from lecture slides, lecture notes, and the corresponding textbook material. There is a lot of information in this class, so I urge students to: 1) attend class, 2) take detailed notes and 3) ask questions in class or office hours.

There will also be a comprehensive final exam at the end of the course that will be multiple-choice and short answer questions.

***Make up exams will not be administered except under situations like a documented medical or family emergency. If a situation like this arises, please provide me with a notice from the Absence Memo Office.**

QUIZZES: A brief “Clicker” quiz or questions will occasionally be given at the start of, during, or upon completion of *lecture*. These quizzes may be on material we just went over, material we went over in the prior class period, or material that we are about to go over that day. **Quizzes will start on the second week.** These are to encourage students to stay current with reading and material and **read ahead before coming to class.** These are a great opportunity to test your understanding, identify areas where you need to focus (or ask me questions), and improve your grade (**they make up 25% of your lecture grade!**).***Quizzes cannot be made up if you are late to class or absent (unless by an excused absence-see above information for make up exams).**

ASSIGNMENTS:

We will have assignments during (and sometimes outside of) *lecture* over the course of the semester to encourage active participation and collaboration and discussion among students. These activities (Think, Pair, Share; short writing assignments; reading and reviewing articles and news stories; and others) will be handed in and graded based on both individual participation and content and will make up 100 of the total points available in the *lecture*. This is an easy source of points that will be missed if students are not present in lecture or don't turn in their assignment on time. These assignments cannot be made up if students are late or absent (unless by an excused and documented absence as outlined above).

RELEVANT ARTICLES and STORIES:

Scientific inquiry and a growing understanding of global biological systems impact the everyday lives of humans and the functioning of ecosystems on this planet. In order to help link biological science and the process of the scientific method with the lives of students, we will briefly go over recent interesting or historically important scientific literature and/or news articles during class. On average, there will be one new article per chapter. These papers/articles will also be provided on OAKS and, in some cases, students will need to read these prior to coming to class. **Materials from these papers/articles will not be on in-class exams, but basic questions from these papers might be on “clicker” quizzes and will make up ~10 % of the questions on the final *lecture* exam.**

ATTENDANCE and CLASS ETIQUETTE in BOTH *LECTURE* and *DISCUSSION*:

Attendance to lectures contributes to your grade and you are **expected to attend** each meeting of the lecture. If you miss a class, you will lose available quiz and activity points and miss important information that will make it difficult to succeed in the course. Students are **required to attend** each 3-hour discussion and are expected to arrive on time and prepared to conduct the work and stay for the entire duration. For group projects in discussion sections, other students are counting on you to be there. Being absent from more than 30% of the lectures and discussions may lead to a “WA” (failing grade equivalent).

Students are responsible for getting notes or any missed information from classmates and/or visiting the professor during office hours if they have questions due to a missed class.

Please do not spend class texting or using the Internet for activities not related to class. This is distracting to students that are learning the material or especially (in this class) peers that are presenting. Please be respectful of others in your group and class.

All small (cell phones, tablets) electronics must be turned off during class (unless during a quiz). Computers are allowed for note taking, but this will be restricted if students are using their computers for activities not related to class. **Students should bring personal laptops (if they have them) with Excel and PowerPoint to discussions. Students without personal computers can use department computers.**

Please be understanding of other students need for a quiet classroom and do not talk during class, tests, or quizzes. Please also refrain from distracting activities like eating in class.

ASSIGNMENTS IN BOTH *LECTURE* and *DISCUSSION*: Assignments must be turned in on time for full credit. Late assignments (without valid and documented excuse-see above) will lose 5% of the total possible points per day that the assignment is late, until the assignment is handed back or discussed in class, at which point zero points will be recorded. If you are unable to turn in an assignment during class, please turn it in to me in person or via OAKS.

**ASSESSMENTS, and GRADING in *DISCUSSION*:
PROJECTS**

You will conduct three main projects as well as smaller assignments for discussion. In general, there will be an assignment due at the start or end (or both) of each discussion period. Some of the work on these projects will be completed in pairs or small groups. Part of your grade will be based on working effectively within your group, including peer evaluations of your work. However, you will complete most assignments individually, and most of your grade will be based on your own work, for which you alone are responsible.

Project 1: Scientific method, hypothesis generation, data organization and statistics, graphing, literature searching, and writing.

Project 2: Citizen science activity: experimental design, literature searches, scientific paper writing and communication.

Project 3: Biodiversity hotspots and conservation: research taxonomic groups of interest; gather literature to support the argument to protect an organism.

Helpful Advice to do well in this class:

1. Attend class-lecture and discussion!
2. Get involved. Ask questions (to both the instructor and your peers).
3. Don't just take notes, LISTEN and LEARN during class time (active learning).
4. Read through your notes regularly, don't get behind.
5. Do the readings as you go along, DON'T PROCRASTINATE.
6. Do the assignments/projects well ahead of time. They can be time consuming so DON'T PROCRASTINATE.
7. Try studying with a partner or group and TALKING through the information. If you can explain concepts to another person, you will have them mastered.
8. Study to understand, not to memorize.
9. Remember to think logically about biological concepts; you will frequently be able to reason out an answer instead of just memorizing it.
10. Come see me with your questions or concerns. If you are engaged in your learning, you will have questions and I am happy to help!

COURSE and PROFESSOR EVALUATIONS:

Course evaluations will be completed in class towards the end of the semester.

SCIENCE TUTORING LABS:

<http://csl.cofc.edu/labs/>

<http://csl.cofc.edu/labs/science-lab/index.php>

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 skills, and course content. They offer tutoring, Supplemental Instruction, study skills 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.

ACCOMODATING DISABILITIES:

The college and professor will make any reasonable accommodations for students with documented disabilities. If students need these accommodations (outside class exams/extended time/etc...), they should see the Center for Disability Services/SNAP (located on the first floor of the Lightsey Center, Suite 104) and get a formal notice from SNAP to the professor as soon as possible so that we can make necessary arrangements.

NAME and PRONOUN PREFERENCE

I will gladly honor your request to address you by the name and gender pronouns of your choice. Please advise me of this early in the semester via your college-issued email account or during office hours so that I may make the appropriate notation on my class list.

FOOD and HOUSING INSECURITY

If you are housing or food insecure, there are programs through the College that may help. Students can contact Mark Antoine at antoinemp@cofc.edu or visit the Dean of Students in the 3rd floor of the Stern Center.

HONOR CODE AND ACADEMIC INTEGRITY:

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are Academic integrity is essential at the College of Charleston and to the practice of science. You will therefore be held to a high standard of integrity in this course. Plagiarism, lying, cheating or attempted cheating are violations of the College's Honor Code. Any Honor Code violations that occur will be handled as outlined in the Student Handbook. Please be absolutely sure that you understand what the Honor Code requires of you:

<http://studentaffairs.cofc.edu/honor-system/>

<http://studentaffairs.cofc.edu/honor-system/studenthandbook/>

<http://parkj.people.cofc.edu/HonorCode.pdf>

If you have any questions or concerns about Honor Code expectations or about how to avoid violations, please consult with the instructor.

Plagiarism: Plagiarism is any use of words or ideas produced by another person without proper attribution, and includes failing to paraphrase adequately or to cite sources properly. The Honor Code forbids plagiarism, both intentional and unintentional. Please consult the instructor if you have any questions or concerns about how to use and cite sources to avoid plagiarism.

Collaboration: Many of your discussion projects will involve working with other students. Nevertheless, the work you submit must be completed independently and must represent your own independent ideas, unless the instructor specifically requires a joint product. Please be sure that you understand the distinction between collaborating and copying; ask me if you have any doubts.

Suspicious of unauthorized collaboration will be dealt with according to the Honor Code.

Re-using work: Please be aware that using work that you or anyone else has done for this or any other class or project, either in whole or in part, is a violation of the Honor Code, even if the work is revised. Biology 211 instructors keep copies of assignments submitted by students in previous semesters, and reuse or revision of such will result in reporting to the Dean of Students.

TENTATIVE LECTURE SCHEDULE

Remember to prepare for lecture by **reading ahead in the assigned chapters**. In addition to textbook readings, we will discuss several scientific articles during the semester. If an article is assigned, please read before class. Articles will be available via OAKS.

22 nd August	Syllabus, Introduction to Biodiversity and Conservation [1, 54].
Evolutionary Patterns and Processes	
24 th August	Evolution and Natural Selection [22].
27 th August	Evolution and Natural Selection [22].
29 th August	Evolutionary Process [22, 23]
31 st August	Evolutionary Process [22, 23]
3 rd September	Evolutionary Process [22, 23]
5 th September	Speciation and origins of Biodiversity [24]
7 th September	Speciation and origins of Biodiversity [24]
10 th September	Speciation and origins of Biodiversity [24]
12 th September	Phylogeny and the History of Life [25]
14 th September	Phylogeny and the History of Life [25]
17 th September	Phylogeny and the History of Life [25]
19th September	EXAM #1
Ecology and Conservation Biology	
21 st September	Evolution to Ecology [49,50]
24 th September	Evolution to Ecology [49,50]
26 th September	Evolution to Ecology [49,50]
28 th September	Population Growth/Ecology [51]
1 st October	Population Growth/Ecology [51]
3 rd October	Population Growth/Ecology [51]
5 th October	Community Ecology [52]
8 th October	Community Ecology [52]
10 th October	Community Ecology [52]
12 th October	Ecosystem and Global Ecology [53]
15 th October	Ecosystem and Global Ecology [53]
17 th October	Ecosystem and Global Ecology [53]
19 th October	Biodiversity and Conservation Biology [54]
22 nd October	Biodiversity and Conservation Biology [54]
24 th October	Biodiversity and Conservation Biology [54]
26 th October	Biodiversity and Conservation Biology [54]
29 th October	Biodiversity and Conservation Biology [54]
31st October	EXAM #2
Diversification of Life	
2 nd November	Domains of Life and Bacteria/Archaea [26]
5th November	FALL BREAK-NO CLASS
7 th November	Bacteria/Archaea and Protists [26, 27]
9 th November	Protists, Green Algae, and Land Plants [27,28]
12 th November	Green Algae, Land Plants, and Fungi [28]

14 th November	Fungi [29]
16 th November	Introduction of Animals [30]
19th November	EXAM #3
21st November	THANKSGIVING-NO CLASS
23rd November	THANKSGIVING-NO CLASS
26 th November	Introduction of Animals and Protostome [30,31]
28 th November	Protostome Animals [31]
30 th November	Deuterostome Animals [32]
3 rd December	Viruses [33] LAST DAY of CLASS-REVIEW. Course Evaluations
5th December	READING DAY
12th December	FINAL EXAM: 8:00 am to 12:00 pm in lecture room

TENTATIVE DISCUSSION SCHEDULE/ ASSIGNMENTS

You will conduct three projects as well as several smaller assignments during discussion. Although some of the work on these projects will be completed in groups, you will be graded individually on written assignments. **Additional details will be given in class and assignments may be added/removed or due dates changed depending on progress in class. Resources for these dates and assignments will be uploaded to OAKS under tabs for each week.**

Week	Date	Discussion activity	Due in or before
1	Aug 24	Welcome/syllabus. Asking biological questions, generating hypotheses, and introduction to scientific method and literature. Plagiarism discussion.	G&W article Discussion questions (DQ) at end.
2	Aug 31	Project 1: project introduction, pair up, introduction to data, generating questions and hypotheses.	Read Suarez & Case (on OAKS), bring hard copy to class, bring completed DQ for Suarez & Case (due at start of class) Dataset pick and worksheet at end
3	Sep 7	Project 1: Data management and graphing.	Data worksheet at end
4	Sep 14	Project 1: Statistical analysis of data. Project 1: Poster presentation prep	Statistics worksheet at end. Poster draft and feedback in class.

5	Sep 21	Project 1: Research poster session Introduction to Phylogenies, Phylogeny activities.	Upload poster to OAKS at end of class. Poster evaluations. Phylogeny worksheets due start of next class.
6	Sep 28	Project 2: Introduction to citizen science project (articles, discussion, online projects). Introduction to an introduction and PowerPoint ideas. Option 1 for library Resources Class (may be at Library; location TBD)	Reading assignments/ worksheets. Introduction to scientific writing articles.
7	Oct 5	Project 2: Citizen science practice. Choose citizen science activity and formulate data collection plan-submit to instructor. PowerPoint on developing and answering scientific questions, library resources and literature. Option 2 for library Resources Class (may be at Library; location TBD)	Worksheets
8 ^e	Oct 12	Project 2: data collection	Data collection, organization
9	Oct 19	Project 2: Citizen science report to class Project 2: Introduction practice	Introduction feedback. Presentation. Written part of project 2 due next week.
10	Oct 26	Project 2: Peer review of paper. Project 3: Hotspot background, pick a hotspot and organisms.	Final project 2 and peer review. Hotspot worksheet and articles (read and bring articles to next class).
11	Nov 2	No Class-Fall Break	No Class-Fall Break
12	Nov 9	Project 3: Tools for conservation biologists and hotspots. Project 3: Biodiversity hotspot research, questions, and writing Project 3: Literature review for conservation	
13	Nov 16	Project 3: Present biodiversity hotspot/organisms. Project 3: paper reviews	Project 3 presentations in class. Review conservation paper.

14	Nov 23	No Class-Thanksgiving Break	No Class-Thanksgiving Break
15	Nov 30	MFT Exam	Project 3 final paper due

* Assignments will be due at the *beginning* of discussion, unless otherwise noted. In-class worksheets will be due at the *end of discussion*, unless otherwise noted in class.

GRADING BREAKDOWN:***Lecture***

- Exams: 300 Points (100 points each)
- Final Exam: 200 Points
- In Class Quizzes: 200 Points
- In Class Assignments: 100 Points

Discussion†

- Project 1: 100 points
- Project 2: 200 points
- Project 3: 100 points
- Other Assignments and Activities: 100 points

Total: 1300 Points

$\geq 93\% = \mathbf{A}$	$90-92 = \mathbf{A-}$	$87-89 = \mathbf{B+}$	$83-86 = \mathbf{B}$
$80-82 = \mathbf{B-}$	$77-79 = \mathbf{C+}$	$73-76 = \mathbf{C}$	$70-72 = \mathbf{C-}$
$67-69 = \mathbf{D+}$	$63-66 = \mathbf{D}$	$60-62 = \mathbf{D-}$	$\leq 59 = \mathbf{F}$

- 0 due to academic dishonesty = XXF

I do not curve grades on exams, assignments, or final scores in the class, but there are opportunities (other tests, quizzes, and assignments) to make up points if you do poorly on a single test or assignment. If, at the very end of the semester, your final grade is near (<0.5 points) a letter grade threshold, I will round up. As an example, if you have a 79.6, I will round up to an 80 and you will have a B- in the class. In comparison, if you have a 79.5 or below, your grade will remain a C+. This cutoff system is the only way that I can maintain a consistent treatment of grades across students, so there will be no exceptions.

† Each project will be graded as a portfolio, including the final products and all work leading up to those products (e.g., worksheets, quizzes, participation).

EXTRA CREDIT:

Extra credit options are of minor point value. They are available for a **maximum of 20 points** (remember out of your 800 total). Some extra credit questions may also occasionally appear on the exams for a couple of extra points. Note that your time is better spent studying the material than doing extra credit.

Option #1 (10 points each): Read a peer-reviewed, published scientific article on a subject that interests you (**not one from class or that we talk about in class**). Write a one page (double spaced) summary of the article. For full credit, make sure to outline why the authors did the research, what their hypotheses or predictions were, the methods they used to test their hypotheses, and their results and conclusions. Also make sure to mention why you were interested in the article and attach a copy of the article to your summary to receive full credit. **The article and summaries must be handed in to me (hard copy only) by 5 pm on December 3rd.**

Option #2 (10 points each): Go to: <http://www.iucnredlist.org> and find an organism that is of interest to you. Write a one page (double spaced) summary of the organism and why it is of interest to you. For full credit, only include an organism that has been evaluated by the IUCN and discuss what its status is, how that status was determined, what the major threats to its survival are, where it is found and its current/historical range, how many of the species are left in the world, its common and scientific name, and what, if anything is being done to protect it. **This information must be handed in to me (hard copy only) by 5 pm on December 3rd.**

Option #3 (10 points each): Watch a TED Talk: <https://www.ted.com/talks> on some sort of Biological Science/Conservation Biology/Ecology/Biodiversity/Chemistry subject and write a one page (double spaced) summary of it. For full credit, include a link to the talk, discuss who gave it, why they decided to give it and/or why they were the best person to talk about the subject, give a summary of the main take home messages, how it relates to a subject we talked about in class, and why it is important to be discussing right now. **This must be handed in to me (hard copy only) by 5 pm on December 3rd.**

Option #4 (4 points each): Go to a department (<http://biology.cofc.edu/departmental-seminars/>) or Grice Marine Laboratory (<http://gricemarinelab.cofc.edu/research/marine-science-seminar/index.php>) seminar. To receive credit you must hand in a typed 5 sentence summary of the seminar that you participated in which also includes a description of what you learned from this seminar.

***Note that this syllabus is subject to change over the course of the semester.**
