

BIOLOGY 211–03
BIODIVERSITY, ECOLOGY AND CONSERVATION BIOLOGY

College of Charleston, Department of Biology, Spring 2020

Lecture: 10:50 am - 1:50 pm T; RHSC 271

Discussion: 10:50 am – 1:50 pm R; RHSC 271

Instructor: Dr. Daniel McGlinn

Office hours: 2-2:30 pm T/R

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or email to make an appointment

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Course Description: This course focuses on biology at the level of the whole organism and above, including how organisms interact with their environment, how organisms are related, and how human activity affects the diversity of life on Earth. During the semester, you will be introduced to three areas of focus: (1) population biology, including population ecology and evolution; (2) interactions among organisms and their environments at the community, ecosystem and biosphere levels, and (3) biodiversity and the study of how groups of organisms are related by common descent.

Course Structure: Doing biology requires understanding concepts and using practical skills to develop and test those concepts. To address both of these features, this course includes two essential components – lecture and discussion – which contribute to a single grade (see p. 5).

Lecture will introduce you to key concepts in ecology, biodiversity and conservation biology as well as examples of the research involved in developing and testing these concepts.

Discussion will help you develop many of the practical skills used in doing science. You will gain experience examining primary scientific literature; organizing, visualizing and analyzing data; identifying research questions and designing experiments; and presenting scientific information in a written scientific paper, a poster, and an oral presentation. For many students, discussion is the most valuable part of the course.

Required Text: *Biological Science* 5th, 6th, or 7th editions. S. Freeman

Prerequisites: Biology 111, 112 – Please note: It is highly advised that students earn at least a C in Biology 111 and 112 before enrolling in Biology 211. Please see your instructor if you have any questions or concerns regarding your preparedness for this course.

Instructional Objectives

This course is intended to foster an understanding of the diverse ways organisms interact with the environment, the fundamental principles of ecology, evolution, and conservation biology, and to learn about the three domains of biodiversity on Earth. More specifically as a student in this course you will

- review the theory of evolution, as posed by Charles Darwin.
- explore the modern synthetic view of evolution which integrates genetics, molecular biology and many other areas of biology into an explanation of how evolution occurs.
- 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 of organisms change in abundance and distribution (population ecology)
- explore ecological interactions between species within communities (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).

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
- explain the forces that lead to evolutionary change in populations and diversification among species
- interpret phylogenetic trees to comprehend the evolutionary relationships they depict
- discuss how interactions with the physical environment and with other organisms influence populations and communities
- build a foundation of knowledge about life’s diversity and its interrelatedness
- apply ecological and evolutionary principles to the conservation of biodiversity
- apply the following skills used by professional biologists: use primary literature, generate scientific questions and pose testable hypotheses, analyze data to evaluate hypotheses, use quantitative models to describe biological processes, and communicate these to a scientific audience.

COURSE POLICIES

Lecture – You are expected to attend every lecture. Attendance and participation will contribute to your grade. In addition, it is very difficult to succeed in this course without regular attendance in lecture. If you must miss lecture, be sure to get help with the notes from a classmate; *online lecture notes are not a substitute for attending lecture!* All students are encouraged to meet with the instructor during office hours to ask questions. I'm always willing to take time to help you better understand the course material!

Discussion – You will conduct two main projects during discussion. 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. You are required to attend every 3-hour discussion for its duration, and you are expected to arrive on time and prepared to carry out the day's work. Attendance and participation will contribute to your grade.

Participation and conduct – Your conduct during lecture and discussion is expected to be respectful of your classmates and instructor, the learning environment and yourself. This means giving your full attention to whomever has the floor and staying on topic during discussions. Please do not disrupt class by using cell phones or other electronic devices (unless for Poll-everywhere), by leaving early or arriving late, or by using the bathroom excessively. Participation in lecture will be evaluated in part on participation of polled questions. You can reply to polls via txt message, smart phone app, laptop, or note card depending on your preference. Specifically, your participation grade for the class will depend on: online polls, class preparedness, attendance, tardiness, your verbal engagement with the instructor during class, proper device conduct, and your ability to conduct group work.

Discussions articles and assignments – Over the semester you will read several articles that will be the basis for class discussions, both in lecture and discussion. Your grade for these discussions will be based on attendance, active participation, and completion of discussion question (DQ) assignments. Articles and DQ assignments will be available via OAKS, as will detailed guidelines on how to prepare for discussions.

Exams – You will be tested on lecture material and assigned readings. Study guides will be provided before each of the three midterm exams. You are encouraged to study in groups – you will learn more if you quiz each other to test your understanding and ability to apply concepts.

Exams cannot be made up except in the case of a true medical emergency *suffered on the day of the exam*. Other legitimate, unavoidable academic conflicts are at the instructors' discretion and must be approved *well in advance*. Extracurricular activities and travel plans do not qualify – please plan accordingly. Make-up exams will only be given for excused absences with instructor approval, and must be taken before the exam is handed back to the class and no more than three days after the scheduled exam time.

Assignments – Assignments must be turned in on time for full credit. Late assignments 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 the instructor in person or under my office door. Email Dr. McGlinn so that he can expect to find your assignment.

Electronic resources – Course information will be available via OAKS, including details of assignments, assigned articles, and lecture notes. Lecture notes are typically available at least 24 hours before lecture. Some students get more out of lecture by printing the lecture notes from OAKS and bringing them to lecture, while others will learn more by using the online notes to review after lecture – please consider what works best for your own learning style. I will use email, as well as OAKS, to communicate with you regularly; you are responsible for receiving and reading these communications, so please be sure to check your g.cofc.edu email account as well as the course OAKS site frequently.

Although lecture notes are online, you are expected to attend lecture in person and to be present and engaged with the class, not your computer. Lecture notes are *supplements* to lecture – much of the important content is discussed verbally and is impossible to reconstruct from the notes alone.

All written assignments must be typed. Computers will be also used extensively in discussion, including Excel and Powerpoint. We have access to Biology department computers, but any student with their own laptop is encouraged to bring it to discussion. For work outside of class, Addlestone library has computers available with the necessary software.

Tips for success –

- 1) Coming to class having already read the material presented in the text
 - 2) take notes on the text and come to class with questions.
 - 3) re-writing your notes including graphs and phylogenies, making flash cards
 - 4) studying by actively quizzing your classmate
 - 5) use textbook additional resources to challenge yourself with additional quantitative problems
- Students who succeed develop skills in learning how to study that matches their learning style outside of the classroom – we'll help you identify and develop those skills. We'll emphasize skills and approaches to help you develop good study skills that go beyond the biology classroom.

Center for Student Learning – offers tutoring, study skills appointments, and workshops. Services are available to all students 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. *211 specialists are available*

Students with Disabilities and Special Needs – The College will make reasonable accommodations for persons with documented disabilities. If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact the Center for Disability Services (CDS/SNAP program) located in the Lightsey Center, Suite 104, 953-1431, SNAP@cofc.edu. If you have a documented disability and need accommodations, please come talk with me and bring your Professor Notification Letter (PNL) as soon as possible. SNAP students are requested to make arrangements with the instructors *well in advance* of exams.

College of Charleston Honor Code and Academic Integrity – Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when suspected, 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 status indicator 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. Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. 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>

LECTURE SCHEDULE

This schedule is subject to change as the semester progresses. Stay tuned for class announcements and updates on OAKs. Please prepare for lecture by reading the assigned chapters. Lectures will refer to assigned readings, but will not simply repeat what you have read. You will get more out of lecture if you read the material beforehand, and you can reinforce the lecture material by reviewing the reading again afterward. Exam questions will be drawn from both lectures and readings.

Week	Date	Day	Lecture Topic (subject to change)	5 th ed. Chp	6 th ed. Chp
1	Jan-9	R	Measuring Biodiversity in a Changing World	57	54
2	Jan-14	T	Diversity of life and its uncertain future		
3	Jan-21	T	no lecture this week		
4	Jan-28	T	Evolution, Natural Selection	25	22
5	Feb-4	T	Selection and Population Genetics		
6	Feb-11	T	Exam I		
7	Feb-18	T	Evolutionary Processes	26	23
8	Feb-25	T	Macroevolution and Origins of Life; Field Trip to CofC Natural History Museum	27-28	24-25
9	Mar-3	T	Behavioral Ecology	53	53
10	Mar-10	T	Behavioral Ecology		
11	Mar-17	T	Spring Break		
12	Mar-24	T	Population Ecology	54	51
13	Mar-31	T	Exam II		
14	Apr-7	T	Community Ecology	55	52
15	Apr-14	T	Ecosystem Ecology	56	53
16	Apr-21	T	Course Evaluations ; Review Material for Final		
	Apr-28	T	Final exam 8-11 am		

DISCUSSION SCHEDULE

Discussion will include both weekly activities and longer-term research projects. Assignments will include both independent and group work. Please see lecture syllabus for general overview of goals and policies for discussion sections. The syllabus schedule is subject to change, amendments will be announced. Find materials for readings of papers on OAKS.

Please read this syllabus carefully and keep it for future reference. The information in this document is important to your success in this course.

Week	Date	Thursday Discussion	Due in Thursday Discussion	Home Work
1	Jan-9	no discussion this week		read Klein et al. paper and DQs
2	Jan-16	Academic advising, Introduction to scientific papers, what are the parts of a scientific paper	Klein DQs	
3	Jan-23	no discussion this week		
4	Jan-30	project 1: graphing data		finish graphs
5	Feb-6	project 1: statistical analysis	Graphing Assignment	finish analyses
6	Feb-13	Project 1: poster workshop	Stats assignment	work on poster
7	Feb-20	Project 1: Research Poster Session	Poster due	aquarium species natural history, behavior study sci paper & DQs
8	Feb-27	Project 2: Aquarium	aquarium species natural history	prelim data analysis
9	Mar-5	Project 2: Library resources and searching lit	prelim data analysis	Annotated bibliography and final analyses
10	Mar-12	Project 2: Research priorities & experimental designs	Annotated bibliography and final analyses	paper draft
11	Mar-19	Spring Break		
12	Mar-26	Project 2: Peer editing and feedback on manuscript draft	paper draft	paper
13	Apr-2	Project 2: oral presentation workshop	paper due	oral presentations
14	Apr-9	Project 2: Oral presentations	talk due	
15	Apr-16	no discussion this week		
16	Apr-23	no discussion this week		

Extra Credit

You can earn up to 3% of your final grade in extra credit by completing 3 additional assignments. Each extra credit assignment you complete will provide 1 percentage point on your final course grade up to a total of 3 additional percentage points. There are two options for the assignment:

Option 1: Attend a biology science seminar. You must attend the seminar and post a typed 5 sentence summary of the seminar which also includes a description of what you learned from this seminar. Here is the link to relevant seminar series

- <http://gricemarinelab.cofc.edu/research/marine-science-seminar/index.php>

Option 2: Find a fake news science article online and create a three slide powerpoint summary demonstrating why it is fake. In addition to the science be sure to include the article's relevance to this course, any relevant images / graphics, and the URL. Place the powerpoint file into the extra credit dropbox folder on OAKS.

COURSE ASSESSMENT

Portion of Course	Item	Percentage of Grade
Lecture	two mid-term exams	25
	final exam (half cumulative)	15
	Participation (polleverywhere, preparedness, attendance, verbally engage in class, proper device conduct)	10
	Subtotal	50
Discussion	project 1 (scientific poster)	10
	project 2 (scientific paper)	15
	project 2 (oral presentation)	10
	weekly assignments	10
	Participation (preparedness, group participation, attendance, verbally engage in class, proper device conduct)	5
	Subtotal	50

GRADING POLICY

Letter	Grade	Quality Points
A	Superior	4.00
A-		3.70
B+	Very Good	3.30
B	Good	3.00
B-		2.70
C+	Fair	2.30
C	Acceptable	2.00
C-		1.70
D+		1.30
D	Barely Acceptable, Passing	1.00
D-		0.70
F	Failure	0.00
WA	Failure Due to Excessive Absences (equivalent to an F)*	0.00
XXF	Failure Due to Academic Dishonesty	0.00