

Biodiversity, Ecology and Conservation Biology
Biology 211
College of Charleston, Department of Biology
SPRING 2016

Lecture: 211 (sections 01, 02)

Tuesday and Thursday 12:45-2:00 pm, HWWE 213

Discussion:

211-D01 Tuesday 9:55 am-12:44 pm room HWWE 307

211-D02 Tuesday 2:10-5:00 pm room HWWE 307

Instructor: Dr. Matthew (Matt) Rutter

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Office hours: 11-12 Weds Room 152 New Science Center (SSMB) and by appointment

Instructor: Dr. Courtney Murren

Associate Professor, Department of Biology

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Email: murrenc@cofc.edu (best way to reach me, especially for appointments)

Office hours: 1-2 Monday Room 144 New Science Center (SSMB) and by appointment

Learning objectives: The learning objectives of this course are to become familiar with ways organisms interact with the environment, to know fundamental principles of ecology, evolutionary and conservation biology, and to learn about the three domains of biodiversity on Earth. In addition, our learning objectives include

- 1) developing critical thinking skills
- 2) learning about quantitative models in biology as they relate to ecology, conservation and evolution
- 3) learning to synthesize and work with biodiversity data from groups ranging from bacteria to mammals
- 4) writing skills
- 5) develop your toolbox of scientific methods

Including

- a) formulate questions and hypothesis generation,
- b) data organization,
- c) data analyses and evaluation of statistical hypotheses,
- d) working with quantitative models
- e) graphing and interpretation of graphs
- f) reading primary literature in biology
- g) synthesizing, summarizing and appropriate citation of primary literature
- h) working independently and in collaborations with other students
- i) presenting findings in written, poster and oral formats

These steps will be practiced throughout the semester including participation in a **CURE** (Course Based Research Experience) acting as a scientist by participating in biological discovery to be shared with students and researchers globally.

The first two thirds of the course are conceptual and quantitative. Many of these topics you may have encountered briefly in 111 or 112*. We take these ecological and evolutionary principles to the next level engaging quantitative and modelling aspects to inquiry. We emphasize reading and writing graphs to develop conceptual and quantitative components of evolutionary and ecological topics and how they relate to conservation biology. Learning in this portion of the course will include understanding mathematical and conceptual models, writing models, working with data, working with models to make predictions as well as grounded in historical development of modern hypotheses and examining the body of evidence for our current understanding. We provide problem sets, worked problems in class and quizzes as ways to develop these skills. (*chapters in Freeman from 111 and 112 posted on OAKS if you took these introductory classes elsewhere.)

In the third section of the course, we will introduce you to the diversity of life on the planet. As conservation of biodiversity includes phylogenetic understanding we emphasize reading, building and creating phylogenies. To be able to bring these concepts to upper division comparative courses, this component of the course also requires a concerted effort in developing skills for learning large body of material and synthesizing this material in a united framework. These skills and understanding of relationships among organisms are essential for future biology major courses as well as careers across the spectrum of biology from conservation to medicine.

We believe strongly in the art of note taking. This is an essential skill -- regardless of your post graduate plans. There is abundant scholarly evidence that suggest that posting powerpoint slides on line does not aid in student learning.

We will provide tools for success:

- 1) providing posted outline of the topics/material as well as graphs/figures presented during lecture you may choose to print these out and bring them to class so that you can draw on the figures,
- 2) office hours during which you're welcome to come and ask questions including re-examine the slides,
- 3) study guides with lists of terms, concepts and example questions to prepare you for the type of learning we expect to prepare for each the exams.
- 4) practice quantitative problem sets

Tips for success with lecture material- (we suggest these active learning techniques outside of the classroom):

- 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 starting 1/21!*

Discussion sessions: The discussion sections are a **critical** component of this course. Discussion is where we will build many of the tools of how scientists do science. Particularly we will spend time working on data analysis, presentation and scientific writing. Students will work both independently and in groups (as scientists do in their daily lives). In the discussion sections, we will investigate several multi-week research projects. We will develop skills for examining, visualizing and analyzing data. We will examine the primarily literature extensively and investigate published data. (see separate discussion syllabus).

Prerequisites for this course include successful completion of Biology 111, Biology 111L, Biology 112 and Biology 112L. Suggested Math knowledge: through algebra or pre-calculus.

Text: Biological Science 5th edition (one with the Chinese water dragon), Freeman

Course Policies

Lecture attendance: Attendance in lecture will set you on the road to success in this course. Lecture is an excellent time to ask questions and participate in an active discussion of topics and hands on activities. We adhere to the College of Charleston Absence Policy, as described in the student handbook. Miss lecture? Get notes and handouts from another. If you will have a planned absence on the day of an exam – you must notify us BEFORE the exam is given. Any make up (with a documented reason) must be completed before the exam is returned to the class (1-5 d from scheduled exam time). All excuses must be documented via the Dean of Undergraduate Study.

Stay tuned in lecture for announcements about posting of critical information on OAKS including hand outs, study guides, extra credit opportunities, practice problems, and online quizzes.

Discussion attendance: Attendance to discussion sections is a **required** component of this course, and is **mandatory**. Your group members will be counting on your presence, effort and intellectual engagement in the project. You must attend your assigned section. Participation in both independent and group aspects will contribute to your grade. *Writing assignments in discussion are a large component of the overall course grade.* If one of the discussion projects is not completed, it is likely that you will *fail the course*. Two unexcused absences in discussion will result in failure of the course.

2 or more excused absences may also fundamentally influence your grade as you would have missed 6 or more hours of hands-on investigations.

Please contact your discussion professor if you know ahead of time you must miss class (e.g. sports, academic conference presentation) to make alternate arrangements.

Assignments and late policy: Assignments will be turned in on time to be considered for full credit. A loss of **5%** will be deducted per school day for **any** late assignment. Zero points will be recorded for an assignment if it is not turned in before the assignment is passed back, discussed in class or key posted. Suitable means to turn in assignment – directly to the instructor, under our office doors, or in our mailboxes in the Biology office in 231 (Biology department office hours are 8:30-4pm weekdays).

Texting: Over the years we have found that texting in class is annoying to your classmates and to the instructor. Don't do it. Emergency? Please step out of the classroom.

Computers: All assignments will be required to be completed on a word processor (or other necessary software (e.g. Excel saved in version MS 2010, Powerpoint MS 2010, statistical software). A Computer lab is available in Harbor Walk (HWWE 206) and is generally open during the day. The Biology computer

lab may be reserved for classes or labs so check the door for postings. There are additional computer labs in the Addlestone library and other locations around campus.

Class Courtesies: Be on time, put cell phones and other devices that beep in silent mode (do not talk on the phone or text message, IM, use Facebook or conduct web searches not associated with assignments during discussion or lecture), do not eat, drink or smoke in the HWWE Laboratory, do study, do ask questions, *make class success a priority by not scheduling other appointments during class time*, be courteous to your colleagues. **Bring your enthusiasm – it is contagious.**

Academic honesty: As is the tradition at the College of Charleston, the academic honesty policy and the honor code are followed in this course (see student handbook for details) which includes but is not limited to plagiarism, class disruption, courtesy to peers and faculty, including email correspondence. If you have questions on how to properly cite, paraphrase or document literature sources, it is your responsibility to consult the instructor for assistance. We are here to help you learn – particularly prior to the assignment due date, including figuring out how to cite appropriately. That said: **PLAGIARISM, INCLUDING FROM WIKIPEDIA, WILL RESULT IN A ZERO ON THE ASSIGNMENT, AND POSSIBLE FAILURE IN THE COURSE AS WELL AS HONOR BOARD REFERRAL.**

Course requirements & Course Points

In Class Exams:	300 Pts.
Final Exam (half cumulative):	250 Pts.
Quizzes (on OAKS), discussion participation, weekly assignments	100 Pts.
Discussion Project 1 Evolutionary Ecology	130 Pts.
Discussion Project 2 Ecology and Conservation	80 Pts.
Discussion Project 3 Biodiversity	110 Pts.
Discussion Presentations (2 presentations during semester)	30 Pts.
<u>Total points:</u> 1000 Pts	

Grading Policy: A: 93-100, A-: 90-92; B+: 87-89, B: 83-86, B-: 80-82, C+: 77-79, C: 73-76, C-; 70-72, D+: 67-69; D: 63-66, D-: 60-62, F: <59, other aspects of grading follow the CofC standards. Last day of drop/add Jan 14, to drop with Grade of "W" March 25th.

Extra Credit: We will offer potential extra credit options all of *minor* point value. A maximum of 21 points may be awarded, 3 per write-up posted in dropbox. NOTE: These extra credits are a token to encourage general science involvement. *Your time is better spent studying for an exam!!*

We will announce in lecture and post on OAKS:

Option 1) Biology Department Seminars: Dates and times will be announced in class

Option 2) Ft. Johnson Marine Seminars: Friday 4-5 pm seminars at Ft. Johnson Marine Campus

To receive credit you must post in OAKS dropbox a typed one page summary of the seminar which also includes a description of what you learned in the seminar.

Discussion Section: **Discussion sections start January 12, 2016. These are a mandatory component of this course. Please see separate syllabus and hand outs for further details of written assignments.

Lecture Schedule

The material in this syllabus is subject to scheduling changes. Dr. Rutter = MTR, Dr. Murren = CJM,

Date	Topic	Readings	Faculty
Jan 07 – Th	Introductions	Ch 1	CJM & MTR
Jan 12 – Tu	Rare and invasive species: humans on planet Earth; Conservation Biology	Ch 57	CJM
Jan 14 – Th	Evolving populations & Natural Selection, conservation genetics	Ch 25	CJM
Jan 19 – Tu	Evolutionary mechanisms	Ch 26	MTR
Jan 21 – Th	Population genetics, ecological genetics	Ch 26; Ap. B:	MTR
Jan 26 – Tu	Population Ecology	Ch 52 & 54	MTR
Jan 28– Th	Population Ecology – population growth & Biological Statistics	Ch 54	CJM
Feb 2 – Tu	Human Population growth and impacts		MTR
Feb 4 – Th*	Species Interactions: Competition and Predation	Ch 55	MTR
Feb 9– Tu	Species Interactions: Herbivory, Parasitism and Mutualism	Ch 55	CJM
Feb 11 – Th	EXAM I		CJM
Feb 16 – Tu	Communities; Succession	Ch 55	MTR
Feb 18 – Th	Productivity; Stability; Ecosystems	Ch 52 & 56	MTR
Feb 23 – Tu	Ecosystems; Origins of Biodiversity	Ch 56 and 28	MTR
Feb 25 - Th	Speciation and phylogeny	Ch 26, 28 and Bioskills B:7	MTR
Mar 1 – Tu	Phylogeny and History of Life	Ch 28	MTR
Mar 3 – Th	Intro to Domains, Bacteria and Archaea	Ch 29	CJM
March 5-13	SPRING BREAK		
Mar 15 – Tu	Bacteria and Archaea	Ch 29	CJM
Mar 17 – Th	Intro to Eukaryotes; Protista	Ch 30	CJM
Mar 22 – Tu	Protists	Ch 30	CJM
Mar 24 - Th	EXAM II		MTR
Mar 29 - Tu	Green algae and basal plants	Ch 30 and 31	MTR
Mar 31 – Th	Plants: the invasion of land and co-evolution with animals	Ch 31	CJM
Apr 5 - Tu	Fungi	Ch 32	CJM
Apr 7 – Th	Animal body plans and basal animals	Ch 33	MTR
Apr 12 - Tu	Protostomes	Ch 34	CJM
Apr 14 – Th	Protostomes & Deuterostomes	Ch 34 & 35	CJM
Apr 19- Tu	Deuterostomes	Ch 35	CJM & MTR
Apr 21 – Thur	NOTE THIS TH a MONDAY schedule	211 does not meet	

Important dates: Jan 11 last day for Drop. *Last day for withdraw with a grade of 'W' Reading day: April 22th, FINAL EXAM: THURSDAY April 28, 4pm - 7pm, HWWE 213