

**Biology 211 / 211D – Biodiversity, Ecology, and Conservation Biology**  
**Marine Biology emphasis (4 credits)**  
Spring 2020 – College of Charleston  
Lecture (MW 2-3:15; RITA 152)  
Discussion (MW 9-12; RITA 273)

Instructor: Dr. Erik Sotka

Email: SotkaE@cofc.edu

Office hours and location: 1-2pm Monday and 1-2pm Tuesday, RITA 226/228.

Phone: 843-953-9191

Communication: The best way to get a hold of me is through my email. I will respond to you within 24 hours during the weekdays, and on or before Monday if you email after 5pm Friday.

Course Description: *An intermediate-level foundation course intended primarily for marine biology majors. Students will explore synthetic biological concepts, including population genetics, population dynamics, community and ecosystem ecology, phylogenetics, biodiversity, and conservation as they apply to marine environments. In a weekly, three-hour discussion section, students will be introduced to local marine ecosystems, analyze scientific literature, formulate research questions, work with biological data from the marine environment, and write for a scientific audience.*

My expectations: My goal is to facilitate your discovery of the fantastic world of marine biology, teach some basic principles that will help with future biological courses, and prepare you for the power and peril of emerging biological technologies. It's essential that you maintain an active presence in the class.

Prerequisites: Biology 111, Biology 111L, Biology 112 and Biology 112L.

Required materials

- **Textbook – open access.** These are available online, but in case your internet is down, please download to your computer / tablet the following:
  - Biology: <https://openstax.org/details/books/biology-2e>
  - Ocean Sciences: <https://reefimages.com/oceansci.php>
- **Online materials.** These will be posted on OAKS as the semester goes along.

Grading policies.

- 1) Daily Quiz: After each lecture, there will be a short (4 questions) quiz on the material. These are available on OAKS. These are open book / open notes. You can take these as many times as you would like. I'll keep the highest score.
- 2) Discussion sessions: Attendance to discussion sections is a **required** component of this course, and is **mandatory**. The discussion sections are a *critical* component of this course. During 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 research projects. We will develop skills for examining, visualizing and analyzing data. We will examine the primarily literature extensively and investigate published data. There are two major projects for the semester.
  - a) **Interactions between an introduced seaweed, native decorator worm, and epifaunal invertebrates.** We pursue statistical analysis of the relationship between worm, seaweed and epifaunal densities. During a field trip, we will see these animals in person.
  - b) **Behavioral and population ecology of marine species.** During a field trip to the SC Aquarium, we will observe and generate data for any marine invertebrate or vertebrate you choose. These data form the basis of a final paper and oral presentation.
- 3) 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 or to the Biology office RITA 253 (office hours are 9-4pm weekdays).

4) Point distribution (700 points)

Midterm exams (2)	200
Discussion participation and assignments**	300
Lecture quizzes (20)	60
Final exam – ½ of exam is 3 <sup>rd</sup> midterm	140

\*\*The relative scores of participation and assignments are TBD.

- 5) Tentative Grading Scale: 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. At the end of the term, I have the option of lowering this scale, if I feel it is justified. **Do not count on this.** Always assume that the grade you earn based on this scale is the grade you will receive.

Final exam: Wednesday April 29 at 8-11 AM. RITA 152

Computers: Unless you are told otherwise, **all assignments should be completed on a computer.** A The biology computer lab is available in RITA and is generally open during the day. There are additional computer labs in the Addlestone library and other locations around campus. Feel free to use your personal computer for assignments – just note that some information and tutorials will be specifically geared towards use with Microsoft Office or Google Sheets software.

Attendance Policies: Miss lecture? Get notes and handouts from another student (note, exam questions come from lecture as well as the text). There will be no make-up quizzes or exams. Anyone who misses an exam will receive a 0, unless the student provides a valid and documented absence memo (see <http://victimservices.cofc.edu/absence-memo/index.php> for details) for missing a scheduled exam. Acceptable excuses include serious illness, personal tragedy or extreme circumstances beyond the student's control. If you have any conflicts with the scheduled exams, you must see me ahead of time, well before the exam date. After receiving one excused exam, a student will be in danger of receiving a grade of Incomplete for the course if any more exams are missed.

Class Courtesies:

- Be on time
- Turn off (or put in silent mode) cell phones and other devices that beep
- 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 study and study together! I highly recommend forming study groups with classmates
- Ask questions
- Be courteous to your colleagues.
- **Bring your enthusiasm – it is contagious.**

All student discipline will be governed by the contents of the Honor Code. This 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 me for assistance.

Accommodations for Students with Disabilities. All graded activities for the lecture and Discussion period will allow students with any disabilities to participate.

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.
- describe the physical environment of coasts, estuaries and open oceans, how it differs from terrestrial and freshwater biomes, and its various roles in sculpting the biology, ecology and evolution of organisms.