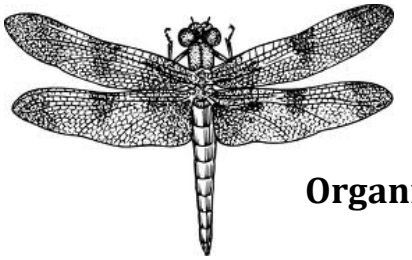

BIOL 1150
General Biology II
Organismal Biology: Ecology, Evolution, and Diversity
CSU Stanislaus, Spring 2018

I. General Information

Lecture: BIOL 1150-006
Tuesday and Thursday, 12:30-1:45pm, Naraghi 101
Instructor: Dr. Matthew R. Cover, Associate Professor, Department of Biological Sciences
The best way to communicate with me is during office hours, or immediately before or after class. The second best way is email; I usually respond to simple questions within 48 hours. Important: Please write "BIOL1150" in the subject line, and include your full name and student ID in the email; otherwise I might miss your email.
Office Hours: Naraghi 273. Tues 2-3pm (after class), Thurs 10:30-11:30am (before class), Friday 1-2pm
Contact Info: mcover@csustan.edu
Personal Website: http://www.matthewrcover.com (learn a bit about my research)

Labs:
BIOL 1150-007: Tues 2:00-4:50pm, N206, Dr. Sara Emerson, semerson1@csustan.edu
BIOL 1150-008: Thurs 2:00-4:50pm, N206, Dr. Sara Emerson, semerson1@csustan.edu
BIOL 1150-009: Thurs 6:00-8:50pm, N206, Christine Parisek, cparisek@csustan.edu

II. Course Description
Introduction to the fundamental aspects of organismal biology: ecology, evolution, and biodiversity. BIOL 1150 is the second semester of the two-semester general biology sequence at CSU Stanislaus. The lecture and laboratory portions of the course must be taken at the same time. It is not possible to take the lab or lecture separately, even if you have passed one or the other a previous semester. This course is designed specifically for biology majors, as well as other science majors who want a comprehensive one-year introduction to biology. All students enrolled in BIOL 1150 must have received a C- or better in 1050. To receive credit for the one-year biology sequence, you must take both Biology 1050 and Biology 1150 at CSU Stanislaus, or transfer the complete, equivalent one-year majors series from another institution.

The General Biology II course is designed to provide students with knowledge about organismal biology. We divide the lecture and lab course into three main components:
Ecology: how do species interact with each other and with the environment?
Evolution: how and why do populations change in their genotype and phenotype over time?
Diversity: how do we classify and describe the major groups of life on earth?

III. Student Learning Objectives

Our goal in this class is not to cover every topic in biology. This is an impossible task in a lifetime, let alone a one-semester class! Instead, we will focus on the most important concepts in organismal biology, and on improving our skills to **Think Like a Biologist**.

Learning Goals

- You will develop scientific habitats of mind, apply these ways of thinking to your own biological investigations, and effectively communicate your findings in written, visual, and oral formats (science skills)
- Cultivate wonder of the natural world while making observations and asking questions
- Use theory and observations to propose hypotheses and design experiments
- Collect data and interpret evidence in a scientific manner
- You will be able to identify ecological processes across a range of scales (organism, population, community, ecosystem, landscape, global), and explain concepts and give examples relevant to each scale (ecology).
- You will design and complete an independent quantitative research project in ecology using an appropriate sampling design, and communicate your findings using appropriate figures and a professional scientific poster presentation (ecology, science skills)
- You will be able to describe how evolutionary processes (sources of genetic variation, natural selection, genetic drift, and gene flow) can cause genotypic and phenotypic changes within and among populations (evolution).
- You will be able to distinguish between ecological and evolutionary processes and describe how they are inter-related (ecology, evolution)
- You will be able to use phylogenetic trees to describe evolutionary relationships among the major groups of life forms on earth, and create phylogentic trees based on morphological and molecular data (evolution, diversity).
- You will be able to describe basic concepts and features of organismal biology (prokaryotic and eukaryotic cells, asexual and sexual reproduction, alternation of generations, vascular tissue, spores and seeds, animal tissues, symmetry, arthropod body plan, vertebrates and adaptations to land), and know how these adaptations fit on the tree of life (diversity).
- You will learn and practice study skills and a mindset that will help you succeed in future science classes (science skills)

IV. Learning Environment and Responsibilities

My Teaching Philosophy and Responsibilities:

I strive to foster a "student-centered classroom." What does this mean? It means the number one reason I am here is to help each and every one of you become outstanding scientists and to succeed in your academic goals. I am concerned about the success of every student in my class.

A student-centered classroom is:

- Interactive: in every class session I will ask you to discuss ideas with your neighbors and write down your own ideas;
- Inquiry-driven: we will pose questions and work together to develop answers using the scientific method;
- Cooperative: you will work closely with your peers to insure we are learning and growing;
- Relevant: we will identify how every topic we examine in this class is connected with the everyday world around us
- I strive to give you frequent and helpful feedback on your progress, and give you advice about how to improve your knowledge and skills as a scientist.
- You will have clear expectations and examples for the questions that will be on exams.
- I will answer questions respectfully and will begin and end class on time.
- I will be fair to all students.
- I will seek feedback from students about the course and my teaching, and always try to improve the learning environment.

Your Responsibilities as a Student:

- Always be writing! Have a notebook with you at all times during lecture and lab, and write down your ideas, interpretations, and questions.
- Actively participate in class discussions, group activities, and peer-peer teaching.
- Help make our classroom a welcoming environment with a positive culture of a learning community: say hello, form study groups, share notes, offer assistance, etc. Some of us may be very comfortable with these social aspects of learning. Some of us may be outside of our comfort zone when we interact. Be respectful of each other.
- Come to class having completed the readings, online lectures, and assignments.
- When class begins, put away your phone, and only use a laptop or tablet to engage with biology. Our brains love the dopamine hit that comes with checking our tects, email, and social media. But it lowers our ability to focus and learn.
- Engage in biology topics outside of class by exploring the wide world of biology in the real world and through media (including social media!); think deeply about what evolution, diversity, and ecology mean for how we, as humans, live in the world.
- Communicate your concerns and questions about the course to the instructor. I am here to help you. There are no silly questions or worries. Any issues that are preventing you from succeeding are important; I will take them seriously and do my best to help.
- Seek out other resources to help you succeed and stay healthy. Many services are offered by the university, including one-on-one tutoring at the library [http://www.csustan.edu/tutoring] and in the CVMSA commons on the first floor of Naraghi Hall. Additionally, the university offers excellent counseling services [http://www.csustan.edu/counseling] in MSR210 and health services [http://www.csustan.edu/health-center].
- [https://www.csustan.edu/grow/academic-integrity-plagiarism].

- Take exams and turn in assignments on the scheduled days and times. Please contact me as soon as possible if you know you will miss or did miss an exam or assignment because of health or wellness issues.
- What makes a positive classroom environment?

V. Required Course Materials

1. Campbell Biology In Focus (2nd edition)
You should have this book from taking BIOL 1050. It is available in many formats, but I highly recommend the loose-leaf three-hole-punched version so you can bring just the chapters you are reading with you to class.
2. iClicker- you'll need this before our second class session.
3. Blackboard course website- internet access
4. Email
I will periodically send out updates and reminders via email. It is important that you regularly check your csustan email address, at least once per day, or set up automatic email forwarding to another email account you check more frequently. This is easy to do by signing in to your csustan email at: https://www.csustan.edu/StudentEmail/ and clicking on "Settings."

VI. Activities and Assessment of Learning Outcomes

Exams (3x100)	300
Final Exam	150
Lecture participation (clickers, homework)	200
Biodiversity survey- iNaturalist	50
Ecology Research Poster	100
Weekly lab quizzes (drop lowest)	100
Lab reports (2x50)	100
Total	1000

<u>Exams</u>
There will be three exams on the main topics (ecology, evolution, diversity), and one comprehensive final exam. Exams will be a mix of multiple choice and short answer questions, based on the study questions and similar to the questions we practice in lecture and in lab. You do not need any special materials except a pencil.

Lecture participation
Each class session I will pose some clicker questions (maybe 3-5) throughout lecture. These are designed to allow you to test your knowledge, and give me feedback on your learning. You will get full credit for participation, whether or not your answers are right (often times there is not one right answer!). Also, I will assign a number of short homework assignments throughout the semester, where I ask you to turn something in.

Biodiversity Observations
A major goal of this class is for you to apply your knowledge of the diversity of life to our surroundings and everyday life. For the iNaturalist biosurvey, you need to observe, photograph, and document the occurrence of 25 species. We'll talk about this during the 2nd week of class, and there will be a separate handout.

Ecology Research Poster
It is important that we gain practice in both learning science as well as learning to do science. Over the course of the semester I want you to perform your own independent project, which you will present during the last week of the semester. The project will involve observations and study of one or more natural ecosystems. You will then make a poster that details your observations and describes how your observations are related to the concepts we cover in this class (evolution, diversity, ecology). We'll talk about this during the 2nd week of class, and there will be a separate handout.

Lab
Lab sections will be involve a variety of activities to help you think like a biologist. The first hour of class will involve a quiz and practice questions. At the start of lab there will be a short quiz (10-12 minutes) covering the concepts from the previous week of lecture and lab. Your lowest quiz score will be dropped, so you can afford to miss one without penalty. After going over the quiz, your lab instructor will pass out some practice questions based on concepts being covered in lecture and lab. You will first work on these individually, then work with a group, and finally talk about the questions with the whole class.
The second part of lab (1.5-2 hours) will involve a variety of activities to give you experience designing, conducting, and communicating research studies in ecology, evolution, and diversity. Over the course of the semester you will produce two lab reports, which will be graded. Even though you will work with a group to conduct the research, you will be responsible for writing your own lab reports.

VII. Schedule

Week	Date	Topics, Questions, Activities, Book Readings
0	1/25	First lecture class: introduction to the course, biological organization (Figure 1.3)
1	1/30 2/1	Ecology: What are the different hierarchical levels of ecology, and what is investigated at each level? (Figure 40.2, 841) Global Ecology: How do climatic patterns affect the distribution of biomes on earth, and in California? (40.1, 842-846) How do depth, light, and substrate affect freshwater and marine biomes? (40.2, 849-852) Lab: Microbial Ecology I- study design, sampling, scale, statistical inference
2	2/6 2/8	Organismal Ecology: How do traits interact with the abiotic and biotic aspects of habitats to influence the distribution of species? (40.3, 852-854, niche concept on 868-869) Population Ecology: How do density, dispersion, and demographics describe populations? (40.4, 854-857) How do life history traits and density influence population dynamics? (40.6, 861-864) Lab: Microbial Ecology II- richness, similarity, t-test, standard deviation, bar charts and error bars
3	2/13 2/15	Community Ecology: What are the possible types of interactions between two species? (41.1, 868-873) What are the differences between species richness, abundance, and diversity, and how do we determine these for a community? (41.2, 873-875) How do trophic structure, food webs, keystone species, trophic cascades, and top-down and bottom-up controls help us predict community dynamics? (41.2 875-877) How do disturbances affect ecosystems, and what is succession? (41.3, 878-880) Lab: Microbial Ecology III- group presentations
4	2/20 2/22	Ecosystem Ecology: Why does energy flow but nutrients cycle through ecosystems? (42.1, 886-888) What controls productivity and biomass of ecosystems? (42.3, 892=894). Global Ecology and Conservation Ecology: How do we define biodiversity, and what factors are causing biodiversity loss? (43.1, 906-911). What is climate change, and what are the impacts to humans and other species? (43.4, 919-926) Lab: Aquatic Macroinvertebrates I: Sorting and identification
5	2/27	Exam 1: Ecology