FUNDAMENTALS OF ECOLOGY (EVSC 3200)

Tuesday-Thursday 11:00 – 12:15

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Course Description: Why isn't the world full of mosquitoes, oak trees, or fish? All these organisms have an amazing ability to proliferate, and unchecked, would easily overwhelm an environment. Yet we know they are not everywhere nor are they hyper-abundant where they are found (usually!). Consider another set of questions from the perspective of looking at the earth from a spaceship. Why is land on earth either green or brown? Why is the ocean blue? Do plant-eating animals create these differences or are the "colors" due to environmental limitations?

To answer these questions and others, you will learn in this course how organisms: 1) are constrained by resources and perils, 2) interact, adapt, and participate in populations and communities that have measurable dynamics and structural features and integrate with the physical environment to form ecosystems. We will work together to develop an appreciation for biological diversity and for how ecological processes support human welfare. We will also learn about the consequences of human activities for ecological systems and how current trajectories are diminishing biodiversity and altering our ecological future.

Learning Objectives: By the end of the course, you will be able to: 1) describe key organismal, population, community, and ecosystem processes, 2) analyze ecological issues and data including simple mathematical models, 3) consider how humans both impact and are a part of ecological systems, 4) recognize the value of biodiversity and ecological systems to human welfare, 5) appreciate the "services" provided by populations and ecosystems like the provisioning of food and freshwater, 6) consider ecological patterns and processes at a planetary scale.

Activities and Resources: The class is structured around topics that range from individual organisms and their adaptation to planetary ecological patterns. We use a hierarchy of individuals, populations, communities, ecosystems, landscapes, biomes, and biosphere to organize the study of ecology. For most classes you will read a chapter in the text. In class in addition to covering lecture material, we will address questions, work on problems, and consider applications of ecology.

Learning will be assessed by four tests. You are also assigned to produce a series of photos (EcoPics) of ecological phenomena.

Resources for the course are provided on the class web site. These materials consist of folders including the lecture presentations, pdf version of the chapters from the textbook (Elements of Ecology 9th edition, Smith and Smith), description of the photo assignment.

Grading Scheme: Course grades will be determined from your combined, weighted scores on a series of tests, an assignment to make a series of photos (EcoPics), and class participation as follows:

Tests: Four tests will be given with each accounting for 20% of your final grade.

EcoPic: This assignment is further described on Collab course site and will account for 15% of your final grade.

Class participation: Attendance will be monitored and contribute to 5% of your final grade.

Course grades are assigned based on your final scores on a 100 point scale: >97 = A+, 93-97 = A, 90-93 = A-, 87-90 = B+, 83-87 = B, 80-83 = B-, 77-80 = C+, 73-77 = C, 70-73 = C-, 60-70 = D, < 60 = F

Attendance Policy: Attending classes is important to explore, review, practice, and deepen your knowledge of the course material. Attendance is required except in cases of illness and excused university activities.

Late Work Policy: Keeping up with course material and assignments is critical. Please complete all tests and assignments by the deadlines indicated. If you have a special reason for needing additional time (e.g., illness) please email the Instructor or Teaching Assistant.

Academic Integrity Policy: As your Instructor I start from a position of trust with all in the class. I will carefully lay out guidelines and indicate what work is to be done individually and "pledged". Please be sure you understand the guidelines before engaging in assignments and tests. Do not hesitate to ask for clarification.

Accessibility: Materials will be made available on Collab. If you have difficulties with accessing course materials, have special needs, or have technical issues, please notify the Teaching Assistant. We will work with you to accommodate needs and resolve problems.

Calendar Overview: Please view the presentations and read the accompanying text chapters before the class meets. The color codes on the calendar are: light blue = test, yellow = deadline for submitting EcoPics photos.

Calendar:

Week	Theme	Date	Activities	Reading
1		Tues. Aug. 23	Course Description	
	What is ecology? How do ecologists learn? What are some of the big questions in ecological science?	Thurs. Aug. 25	Introduction to Ecology	Chapter 1
2	How does climate, land, and water structure life on earth?	Tues. Aug. 30	Physical Environment	Chapter 2-4
	How do organisms evolve?	Thurs. Sept. 1	Adaptation and Natural Selection	Chapter 5
3	How do plants adapt to their environments?	Tues. Sept. 6	Plant Adaptations	Chapter 6
	How do animals adapt?	Thurs. Sept. 8	Animal Adaptation	Chapter 7
		Mon. Sept. 12	**EcoPics Deadline 1**	
4	How are populations measured in space and time? What is population structure?	Tues. Sept. 13	Population Properties	Chapter 8
		Thurs. Sept. 15	**Test 1**	
5	The dynamics of births and deaths and what makes populations have many or few?	Tues. Sept. 20	Population Dynamics	Chapter 9
	The ways of reproduction in the real world and making a life history.	Thus. Sept. 22	Life History	Chapter 10
6	What controls population abundance?	Tues. Sept 27	Population Regulation	Chapter 11
	How do species interact and does it matter?	Thurs. Sept 29	Species Interactions	Chapter 12
		Mon Oct. 3	**EcoPics Deadline 2**	
7		Tues. Oct. 4	No Class Reading Day	
	Where, when, and how do organisms compete?	Thur. Oct. 6	Competition	Chapter 13
8	What are the tricks and traits of predators and prey?	Tues. Oct. 11	Predation	Chapter 14
	What are hosts, vectors, pathogens? Friends in the natural world are common. How do ecological interactions promote or suppress disease?	Thurs. Oct. 13	Parasitism/Mutualism/Disease Ecology	Chapter 15
9		**Tues. Oct. 18**	**Test 2**	
	Ecological communities: do they have a structure?	Thurs. Oct. 20	Community Structure	Chapter 16
10	Food webs: a who eats who paradigm.	Tues. Oct. 25	Community Interactions	Chapter 17

	How do ecological communities change?	Thurs. Oct. 27	Community Dynamics	Chapter 18
		Mon. Oct. 31	**EcoPics 3 Deadline**	
11	What forms the spatial patterns of landscapes and seascapes? Why islands help us understand species coming and going.	Tues. Nov 1	Landscape Ecology	Chapter 19
	What is an ecosystem? What is ecosystem productivity? How does energy flow through ecosystems?	Thurs. Nov. 3	Ecosystems Primary and Secondary Production	Chapter 20
12		Tues. Nov. 8	No Class, Election Day	
		Thurs. Nov. 10	**Test 3**	
13	Death, decay, and the renewal of ecosystems.	Tues. Nov. 15	Decomposition and Nutrient Cycling	Chapter 21
	Cycles, cycles everywhere and what is the limiting nutrient?	Thurs. Nov. 17	Biogeochemical Cycles	Chapter 22
		Mon. Nov. 21	**EcoPics4 Deadline**	
14	Why are there so many kinds of animals and plants and where are they? Can we conserve life on earth (as we know it)?	Tues. Nov. 22	Biodiversity Patterns and Conservation	Chapter 26
		Thurs. Nov. 24	No Class Thanksgiving	
15	People are populations too. Sustainability strategies.	Tues. Nov. 29	Human ecology and sustainability	
	How is the ecology of the planet changing? What future trends are likely?	Thurs. Dec. 1	Global Ecology	Chapter 27
16	Is there an optimistic path?	Tues. Dec. 6	Catch Up, Synthesis, Final Thoughts	
		Fri. Dec. 9	**Test 4**	