

# FUNDAMENTALS OF ECOLOGY

## LAND/LIFE 220

### Fall 2009

#### Contact Information:

**Instructor:** Dr. Scott Newbold

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Office hours: 1:00 PM to 2:00 PM on Wednesday, or by appointment

#### Guest Lecturers:

Dr. Gene Kelly

Dr. Julie Rieder

Jed Meunier, PhD Candidate

Daniel Martin, Colorado Division of Wildlife

#### Course Schedule and Location:

MWF, 12:00-12:50 PM, Anatomy/Zoology W 205

#### Course Web Page:

The class webpage is listed under the RamCT site (<http://ramct.colostate.edu>). Use your eID and password to access the webpage. The webpage will contain links to copies of the lectures, homework assignments, your grades, and other important linkages. It is strongly recommended that you use the webpage! Please let Dr. Newbold know if you have trouble with the webpage.

#### Getting Questions Answered:

We love to talk about Ecology. E-mail is the preferred method for communication, either to answer your question directly or to set up a time to meet. *If you can't make it to the regularly scheduled office hours, we are happy to meet at nearly any time that works for you.*

#### Required Materials:

1. **Textbook.** The textbook for this course (Robert Ricklefs. 2008. *The Economy of Nature, Sixth Edition*) is required, and is available at the bookstore. A single copy of the text will be on reserve in the library.
2. **An i-clicker.** You MUST bring this to class every day.

#### Course Description:

This course provides an introduction to the science of ecology. We will become familiar with the basic concepts and techniques used in the field of ecology while examining the interactions of organisms and their environment. During the semester we will explore four main topics: Physiological Ecology, Populations, Communities, and Ecosystem Ecology. In this course, you

will have the opportunity to: learn about ecological patterns and the mechanisms that generate those patterns, develop a sense of how natural ecological systems function, and learn about how humans alter these systems.

### **Student Goals:**

- Develop an appreciation of the modern scope of scientific inquiry in the field of ecology
- Improve ecological literacy by learning the basic principles and concepts of the field of ecology
- Improve analytical and writing skills through analysis and interpretation of ecological data
- Develop critical thinking and problem solving skills by evaluating applied ecological problems

### **Lecture Notes:**

Copies of lecture materials (mostly PowerPoint slides) will be available on the course webpage. They will be posted by 9:00 PM the night before each class (except on Mondays when they will be posted by 9:00 AM Monday morning). PowerPoints provide the main outline for each lecture. I will write notes on the board to convey more detailed information; therefore, I strongly encourage you to take notes in class!

### **Quizzes and Homeworks:**

At the beginning and at the end of the semester, there will be a quiz to take on RamCT. The first one will enable us to evaluate how much general ecology you already know. The second one will enable us to evaluate how much general ecology you've learned in the semester. You will get 5 points each time just for taking the quizzes. While we want you to do your best in choosing the correct answers, you will not be graded on the quizzes themselves, just on whether you took them or not.

There will be at least two surprise in-class exercises worth 10 points each.

There will be 2 homework assignments that will help improve your data interpretation skills, and provide you with greater familiarity of conceptual issues. **LATE HOMEWORK WILL NOT BE ACCEPTED.** Late is defined as any time after the **BEGINNING** of class on the due date.

### **Exams:**

Exams will contain mostly multiple-choice questions. There may also be one or two short-answer questions. There will be three exams during the semester. All exams should be considered comprehensive since the information in each unit is synthetic and builds strongly on previous material. Exams will be given during the regularly scheduled class period. **THERE WILL BE NO MAKE-UP EXAMS** unless there is clear documentation several weeks in advance of an academic conflict, or a doctor's written confirmation of a medical emergency. I will determine if your absence is legitimate, and may allow you to reschedule your exam one or two days before the scheduled exam date.

**The final exam** will be cumulative. It will be administered from **11:20 AM–1:20 PM on Thursday, December 17<sup>th</sup>**. The format of this exam will be similar to the others in this class.

### Clicker Questions:

Along with traditional methods of communication (e.g., raising your hand or group discussions), we use clickers to answer questions in this class. Clickers can be purchased at the CSU bookstore. In order to receive credit for participation and extra credit options in this course, you must have a clicker. After you purchase the clicker, go to the CSU clicker webpage (<http://clicker.colostate.edu>) to register it. When you register, you will need to put in your eName and ePassword as well as the serial number on the back of your clicker. **Please do this by the 2<sup>nd</sup> lecture.** Clickers you use in other courses can be used in this course. Remember to register your clicker every semester. A total of 20 points will be available from “Clicker Questions” asked throughout the semester. I will randomly choose 20 classes where I will assign clicker participation credit based on participation in Clicker Questions from that lecture. Note that you do not need to select the correct answer to get credit for these questions. However, you can earn up to 5 extra-credit points by answering Clicker Questions correctly. Those 5 questions that are worth extra credit will be chosen at random from all the questions asked during the semester...so for extra credit, do your best to carefully answer all of the Clicker Questions. You will also use your clicker during lectures to respond to Clicker Questions that are designed to generate discussion, get a feeling for student’s experiences and knowledge about a particular new topic, and assess the class’s general understanding of the lecture material.

### Grading:

	Points	Total	%
On-Line Pre- and Post- Knowledge Surveys (2)	5	10	2.04
Homeworks (2)	30	60	12.24
In-Class Clicker Questions	20	20	4.08
In-Class Exercises/Questions (2)	10	20	4.08
Exams (3)	90	270	55.10
Cumulative Final	110	110	22.45
Total		490	100
Clicker Question Extra Credit (5 points)			

### Grading Scale:

Letter Grade	Percentage Range
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	60-66%
F	< 60%

**Re-grading:** We will gladly re-grade any question(s) you feel are needed; however, it is your responsibility to follow these rules:

1. When exams/homework are handed back in class, you have 24 hours to identify arithmetic errors on our part.
2. If you would like to have an exam or homework question re-graded, you must submit it with a written explanation of your arguments and the entire exam or homework within one week after it was returned in class. We may choose to re-grade the entire exam.
3. We will gladly speak with you about the material thereafter but absolutely no grade changes will be made once the one-week period has elapsed.

### **Classroom Attitude and Etiquette:**

Our experience in class is only as great as we make that experience. Challenge each other, ask questions, think during lecture, and interact. View your experience in class as dynamic not stagnant, interactive not complacent. I am a resource for you, and I will do my best to answer your questions. So ask away.

Also, please have respect for your fellow students and TURN CELL PHONES OFF during class.

### **Academic Honesty:**

I am required to evaluate your own PERSONAL performance in this course. Plagiarism (representing someone else's work as your own) and cheating (taking an exam in a dishonest way by having access to answers or props that hope to increase a grade) are serious academic offenses. Not only are these practices illegal and can result in loss of a grade in a course, or academic expulsion from the university, but they also degrade the learning environment and rob you of your chance to learn something. Do your own work. If you are struggling, don't resort to cheating, ask for help.

### **Special Needs:**

If you have special needs for lectures, homework or test taking, please contact Dr. Newbold immediately after the first day of class to explain these needs, or speak with him any time if something should develop later in the semester. We will be as accommodating as possible.

### **Summary & Study Tips:**

This course is synthetic, meaning that it weaves together many small pieces of information, from a variety of disciplines, to develop a framework to better understand the patterns, and complicated processes that underlie those patterns, in the natural world. We will explore topics and concepts that are both familiar and new to you. I encourage you to take an active role in the learning process. The more you put into this class, the more you will get out of it!

- Read the assigned chapter from Ricklefs BEFORE you come to lecture.
- Answer the review questions at the end of each chapter in Ricklefs.
- Draw flow diagrams, pictures, or concept maps for each major topic we cover.
- Begin working on assignments as soon as they are assigned.
- Have a friend read your assignments before you turn them in.
- ASK QUESTIONS!

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Tentative Schedule (exact topics subject to change)

Date	Topic	Reading	Homework
<b>Unit 1- Individuals and Physiological Ecology</b>			
August 24	Course Introduction	Ch 1	
August 26	Introduction to Ecology	Ch 1	
August 28	How Ecologists Study the Natural World	Ch 1	
August 31	The Physical Environment & Biomes	Ch 4-5	
September 2	Biomes	Ch 4-5	
September 4	Physiological Ecology: Temperature Relations	Ch 3	
September 7	<b>Labor Day Holiday—no class</b>		
September 9	Physiological Ecology: Temperature Relations	Ch 3	
September 11	Physiological Ecology: Water Relations	Ch 2	
September 14	Water and Other Environmental Factors	Ch 2	
September 16	Energy and Nutrients: Plants and Photosynthesis	Ch 2-3	
September 18	Energy and Nutrients: Heterotrophs	Ch 2-3	
September 21	<b>Exam # 1</b>	Ch 1-5	
<b>Unit 2- Populations</b>			
September 23	Populations and Natural Selection (Evolution)	Ch 6, 13, (17)	
September 25	Populations and Natural Selection (Evolution)	Ch 6, 13, (17)	
September 28	Population Distribution and Abundance	Ch 10, 18	
September 30	Population Distribution and Abundance	Ch 10, 18, 12	
October 2	<i>Guest Lecturer: Population Ecology</i>	TBA	
October 5	Population Dynamics	Ch 11	
October 7	Population Growth	Ch 11	
October 9	<i>Danny Martin: Horned Lizards on the Plains</i>	TBA	
October 12	Population Growth	Ch 11	
October 14	Life Histories	Ch 7	
October 16	<b>Exam # 2</b>	Ch 6, 7, 10-13, 17, 18	
<b>Unit 3 – Community Ecology</b>			
October 19	Species Interactions: Competition	Ch 16	
October 21	Species Interactions: Competition	Ch 16	
October 23	Species Interactions: Exploitation	Ch 15	#1 out
October 26	Species Interactions: Exploitation	Ch 15	
October 28	Species Interactions: Mutualism	Ch 14	
October 30	<i>Dr. Julie Rieder: Invasion Ecology and Applications</i>	TBA	
November 2	Community Ecology: Species Abundance and Diversity	Ch 18, 20	#1 due
November 4	Community Ecology: Food Webs	Ch 18	
November 6	<i>Guest Lecturer: Community Ecology</i>	TBA	
November 9	Biogeography	Ch 21	#1 back
November 11	<b>Exam # 3</b>	Ch 14-16, 18, 21	
<b>Unit 4 – Ecosystems, Landscape Ecology, and Global Change</b>			
November 13	<i>Dr. Gene Kelly: Introduction to Ecosystem Ecology</i>	Ch 22	
November 16	<i>Dr. Gene Kelly: Primary Production and Energy Flow</i>	Ch 22	
November 18	<i>Dr. Gene Kelly: Nutrient Cycling and Biogeochemistry</i>	Ch 23, 24	
November 20	<i>Dr. Gene Kelly: Nutrient Cycling and Biogeochemistry</i>	Ch 23, 24	
November 23	<b>Fall Recess</b>		
November 25	<b>Fall Recess</b>		
November 27	<b>Fall Recess</b>		
November 30	Landscape Ecology	Ch 25	#2 out
December 2	Landscape Ecology	Ch 25	
December 4	<i>Jed Meunier: Disturbance and Succession</i>	Ch 19	
December 7	Global Ecology	Ch 26, 27	#2 due
December 9	Human Impacts and the Future	Ch 26, 27	#2 back
December 11	Global Change Issues: Where Do We Go From Here	TBA	
December 17	<b>Final Exam # 4</b> (11:20 AM – 1:20 PM)	Ch 1-7, 10-27	