

**Dr. Tom Langen:** [tlangen@clarkson.edu](mailto:tlangen@clarkson.edu), phone 268-7933

**OFFICE HOURS:** Mon & Fri 10:00–12:00 in SC 163 (office) or 170G (lab), or by appointment

**TEXT:** MC Molles *Ecology – Concepts & Applications*

**LECTURES:** Mon Wed Fri @ 1:00-1:50 in Snell 175

**CLASS NEWS & INFORMATION:** All information will be on Blackboard. I will also send emails, using your Clarkson email address. You must make sure you check your Clarkson email regularly.

**COURSE OBJECTIVES:** Ecology is the study of the distribution and abundance of organisms. Ecologists study Nature at a broad range of scales, from the adaptations of individuals to their environment, to the global cycles of biotic & abiotic materials that ultimately limit life on earth. In this course, you will be challenged to master material addressing ALL of the breadth of this field! A familiarity with basic ecological concepts is essential for any educated person - these concepts go far to explain why the natural world is as it is, and these concepts also provide the basis for understanding the causes and consequences of human-caused environmental degradation and how it can be ameliorated. All biologists and workers in health related fields ought to have a firm grasp of basic ecological concepts, since these concepts help explain *why* biological entities function as they do, and how interacting species, such as pathogens and their hosts, will affect each other's distribution and abundance.

I have three goals for this course: (1) that you acquire a general knowledge of the breadth and depth of ecological inquiry, and thus increase your general scientific literacy. In addition, this course will provide a foundation for advanced study in the field of ecology (if you are so interested). (2) Improve your ability to read, critique, and explain scientific research. (3) Develop your skills at scientific inference - how scientific conjectures are evaluated through theoretical models and empirical tests.

I stress conceptual understanding of the material - you must try to understand why I discuss a particular example (what is the big picture?). To do well, lecture attendance is essential - you won't gain a full understanding of the material just by reading the course notes. You must keep up with the readings as well; you will get the most out of this course by reading the assigned chapters BEFORE the scheduled lecture. Finally, you can improve your performance by (1) coming to office hours or making an appointment with me to go-over confusing material and (2) forming a study group with other class members to review material.

**COURSE OUTCOMES:** By the end of this course, you should be able do the following: (1) Understand and explain the basic principals of physiological, population, community, and ecosystem ecology. (2) Read a general review paper in ecology, and be able to explain it to a general audience and write a cogent review of its contents. (3) Be able to analyze graphical data and experimental designs to make valid inferences from the data. (4) Understand how quantitative (mathematical) models can be understand and predict ecological phenomena.

**CLARKSON COMMON EXPERIENCE:** This course counts as a C1 (one communication point) toward the Clarkson Common Experience Requirements.

## Lecture Schedule

WEEK	DATE	TOPIC	CHAPTER
1	8/25	What is Ecology?	1, Kingsolver paper
	8/27	Primary Productivity	6
	8/29	Primary Productivity	18 pp 442-448
2	9/1	Primary Productivity	
	9/3	The Fundamental Niche	4
	9/5	Physiological Ecology – Coping with Stress	5
3	9/8	Physiological Ecology – Coping with Stress	
	9/10	Life-Histories	12
	9/12	Life-Histories	
4	9/15	Life-Histories	
	9/17	Patterns of Life on Earth	2
	9/19	Patterns of Life on Earth	
5	9/22	Video – Terrestrial ecosystems	3
	9/24	Video – Aquatic ecosystems	
	9/26	Patterns of Life on Earth	
6	10/1	Population Growth & Its Regulation	
	10/3	<b>Exam 1</b> (8/25-9/26, 15% of grade)	
7	10/6	Population Growth & Its Regulation	11
	10/8	Population Growth & Its Regulation	
	10/10	Population Dynamics & Demography	10
8	10/13	Population Dynamics & Demography	
	10/15	Competition	13
	10/17	Competition	
9	10/20	Exploitation – Predation	14
	10/22	Exploitation – Predation	
	10/24	Exploitation - Disease & Parasites	
10	10/27	Mutualism	15
	10/29	Mutualism	
	10/31	<b>Exam 2</b> (10/1 - 10/29, 15% of grade)	
11	11/3	Species Abundance & Diversity	9
	11/5	Species Abundance & Diversity	16
	11/7	Food Webs	17
12	11/10	Food Webs	18
	11/12	Nutrient Cycling	19
	11/14	Nutrient Cycling	
13	11/17	Succession	20
	11/19	Succession	
	11/21	Geographic Ecology - Island Biogeography	22
14	11/24	Geographic Ecology - Historical Patterns	
15	12/1	Historical Ecology & Climate Change	
	12/3	Anthropogenic Global Environmental Change	23
	12/5	Biodiversity Loss	
16	<b>Final Exam:</b> half cumulative & half exclusively 11/3-12/5, 30 % of grade		

**LECTURES:** Lectures will be illustrated (usually) by PowerPoint presentations. These pages will be made available by the morning of the lecture for printing before class. However, **THE NOTES ARE NO SUBSTITUTE FOR ATTENDING LECTURE.** Attendance is mandatory.

Lecture notes will be placed on the course **BlackBoard** site. The notes can be opened with PowerPoint and Acrobat Reader (available on university computers). You can then print single overheads, three per page, or six per page - look at the page setup and print preferences.

**TEXTBOOK READINGS:** It is essential to read the assigned material to do well in this course. The textbook readings are closely related to the lectures - in fact I will discuss some of the same examples as you will encounter while reading the book. I may orally quiz you about the material in class – watch out! Exam questions will stress the material I have explicitly discussed in lecture, but will also include some material that is only found in the text.

**QUIZZES:** There will be a short 'pop-quiz' approximately every other week. These quizzes will prepare you for some of the kinds of questions you might face on an exam, and should also motivate you to keep up with the material. Quizzes cannot be made up, but I will drop your lowest score. I will post the answers on the web.

**EXAMS:** All exams are 'closed book' and include material from the lectures, the readings, and the videos. Exams will consist of multiple choice, short answer and essay questions. I stress conceptual thinking rather than memorization. The quizzes will give you some idea of the kinds of questions to expect.

Requests for regrades must be submitted *in writing* within one week of receiving the graded exam. A grading key will be posted on the web, please refer to it before making a regrade request that is not due to clerical error (i.e. I added the points incorrectly). Exams cannot be made up except under extraordinary circumstances. Discuss any conflict with me ASAP.

**GRADES:** The grades will be based on quizzes (10% grade), two midterm exams (15% grade per exam), one final (30% grade), reading reports (20% grade), and class participation (10 % grade). For each category, I calculate the proportion of points you earn to the maximum possible (i.e., your grade as a percentage). I then multiple it by its weighting. Thus, if you receive a total of 250 points on quizzes during the semester, and the maximum score (if you got every possible point) is 300 points, the quiz category of your final grade equals  $(250/300) * 0.1$ . I do the same for all other categories and then sum them.

There may be some opportunities for a small amount of extra credit, but such opportunities will be offered to the entire class. Grades will be based on a percentage of the total points: 90% or greater = A, 87-89% = B+, 80-86% = B, 77-79%=C+, 70%-76% = C, 67-69% = D+, 60-66% = D, 59% or less = F. However, I reserve the right to curve down (lower the grade cutoffs) if I judge it warranted.

**MISC. POLICY:** I do not cancel classes before or after midterm/holiday breaks, nor do I schedule makeup exams to accommodate students' travel plans. You are responsible for the consequences of missing class.

I will **NOT** tolerate students walking in & out merely to turn in assignments or take the quiz - it is highly disruptive to students who want to learn and is disrespectful toward me. If this happens frequently, I will take attendance and give those students who have left early zeroes.

*I take a serious view of cheating on quizzes & exams and plagiarism on assignments. I assume that each of you in this course is honest and ethical. If I do detect cheating by you, however, you will receive a zero on the exam or assignment, and your name will be submitted to the committee on academic integrity. Please try to behave in a way that does not create suspicion of cheating. I may ask you or someone near you to move seats. This is not because I am sure that one of you is cheating; it may simply be a means of preventing suspicion.*

## READING REPORTS

Reading Reports are an integral component of this course. You will be assigned to carefully read one of the four papers listed for a section. You will have to write a two page minimum, type-written report on the paper in which you (1) explain the main points of the paper, (2) critique the paper, in light of what you have learned in the class and (3) point out what is the most important 'next-step' to this line of research. You can discuss whether, and why, it is convincing (or not), scientifically significant (or not), and interesting (or not). Would you recommend this paper to someone else?

You will also be required to make an oral group presentation on the paper, prepared (and presented) with other students who were assigned the same article. The presentation must last **no more than ten minutes** – *seven to ten minutes is ideal*. During the presentation, you must explain the general theme of the paper and discuss the most important lessons it provides. Carefully organize your presentation beforehand, so that it is BOTH INFORMATIVE & ENTERTAINING! I encourage the use of power-point to make your presentation interesting. You will have access to a scanner in my lab.

You will be graded on both your written report and the oral presentation. Both will be evaluated for scientific understanding, completeness, clarity, and creativity. 50% of your grade is based on the written report, 50% on the oral report. I will grade the written reports. I am a stickler for clear, clean prose – you should plan to visit the writing center if your writing is poor. Late written reports will be docked 5% each week they are late. Oral presentations will be evaluated by both the class and me (50% grade based on class judgment, 50% by the professor).

To detect 'free-riders', I will ask each of you to assess the relative efforts of all group members on the oral presentation. For example, in a group of 5, if in your judgment everyone contributed equally, then each would be credited with 20% effort but if one person did the lions-share, you might credit that person with 80% and the other four with 5% effort each. I will use the median score of all of the group members' rankings to weight the oral presentation grade. Thus someone who works less than other group members will be penalized, someone who works relatively more will be rewarded.

**Reading Reports 1 *Physiological Ecology* (oral reports 9/15 to 9/19, written report due 9/19)**

**Reading Reports 2 *Population Dynamics* (oral reports 10/13 to 10/17, written report due 10/17)**

**Reading Reports 3 *Species Interactions* (oral reports 11/10 to 11/14, written report due 11/14)**

**Reading Reports 4 *Ecosystems and Environmental Change* (oral reports 12/1 to 12/5, written report due 12/5)**