

# SYLLABUS

## Ecology of Our Changing World (WILD 2200)

### Spring 2009

"Ecology is the scientific study of the interactions that determine the distribution and abundance of organisms."

Krebs, C. J. 1985. Ecology. The experimental analysis of distribution and abundance, 3rd ed. Harper & Row, Publishers, NY. (p. 4)

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**Class:** MWF, 9:30-10:20, AGSC 202

**Gene's Office Hours:** MWF, 10:30-11:30; TR, 11:00-11:50 (except for occasional emergency absences)

If you can not come at this time, make an appointment after class, by phone, or by e-mail.

*Please note that my e-mail is for notifying me in emergencies and for making appointments, not as a substitute for office visits.* I will only answer yes-no and similar questions over e-mail. In my experience it takes far longer to resolve substantial questions over e-mail than it does face-to-face, or even over the phone, because it generally takes several rounds of messages back and forth. If you have a question or a concern, talk to me after class, on the phone, or in my office.

**Kelly's Office Hours:** M, 11:30-1:00; R, 10:30-12:00

**Objectives:** There are three major objectives of this course:

**1) The first objective is to provide a basic understanding of how science is done – the *Scientific Method*.** You should learn how Science as a way of understanding our world differs from other approaches to understanding, and thus how scientific “knowledge” differs from other forms of “knowledge.” The goal is for you to be able to pick up the paper or *Time* magazine and see and understand the flaws when you read “Scientists have proven that...” and to understand why you might hear that peanut butter is bad for you one year and then that it is an important part of a healthy diet the next. Most important, you will hopefully be able to carefully evaluate the scientific claims you hear from your

neighbors, on the evening news, and in the junk mail you receive daily asking for money – to *critically* evaluate the claims being made, not based so much on the facts, which you may or may not know, but on the presentation and on the types of evidence presented. You will be surprised at how much more of an informed citizen you can be with a basic understanding of the Scientific Method.

**2) The second objective is to provide you with basic "ecological literacy," or an understanding of the fundamental ecological relationships among different organisms and between organisms and their physical environment – an understanding of life in our ever-changing world.** Instead of emphasizing current environmental issues directly, we will emphasize the scientific, ecological foundation necessary for understanding both current and future issues. Since the issues, driven by politics and publicity, change much more rapidly than the ecological principles, the principles will serve you far longer. The primary goal is for you to develop a basic understanding of the *Science of Ecology* – to develop a foundation of knowledge sufficient to allow you to interpret the issues with which you and the world will be confronted in the future, to analyze the ecological consequences of various options, and therefore to make informed, rational decisions based on knowledge and understanding, not solely on emotion and opinion. *Education is about learning to think and interpret rather than simply listen and accept.* It is truly dangerous to depend too much on other people's opinions and interpretations, whether the other people are *Earth First!* or *The Exxon Corporation*. A secondary, but in my view very important goal, is simply for you to increase your understanding and appreciation of the intricacy and beauty of the world we live in.

Environmental issues will not be ignored, however. Throughout the course, current controversies will be drawn on to illustrate ecological principles – perhaps acid rain, livestock grazing, human population growth and resource consumption, agricultural practices, species introductions, or similar topics.

**3) The third objective is to develop a basic understanding of *Darwinian evolution*.** To paraphrase the brilliant Russian geneticist Theodosius Dobzhansky, nothing in biology makes sense except in light of evolution. There are millions of species on earth and certainly at least most appear to be pretty well adapted to living where and how they are found – some in the ocean, some in tropical rain forest, some in deserts – some eating plants, some eating animals, some chemically manufacturing their own food. These species adapted to the world they live in through evolution. Furthermore, the world is not constant, but rather it is *constantly changing*. And species must continually change – continually evolve – in order to continue to survive in an ever-changing world.

In summary, this course will explore the Scientific Method, the ecological relationships between organisms and their environments, and the processes and outcomes of evolution.

**Format:** This course will be primarily based on lectures. However, there will be other activities such as occasional slide shows summarizing major topics, class discussion periods, and, of course, occasional tests. Attendance will not be taken, but you are expected to attend

all meetings and participate in all activities – although I do not grade attendance, your grade will reflect the effort you devote to this class.

*Please feel free to ask questions at any time if you fail to understand something.* If I feel the question is getting us off the point, I will suggest we discuss it later, but I will try not to discourage questioning. In fact, I will be questioning you as well. As I lecture, I will be asking questions of you. Sometimes I will pick a name from the class list. Sometimes I will ask the class instead of a person, but if nobody volunteers an answer I will select from the list.

If I call your name and you are not here or do not respond, you lose 5 points, if you offer a thoughtful answer, you get 5 points – not a lot either way, just a little incentive. If called on you have two choices:

- 1) Answer the question.
- 2) Ask to discuss it with your neighbors – after all, we're all in this together. If you choose this option, you will have a minute or so to talk it over with your *near* neighbors and then give an answer.

Getting the "right" answer is not critical, but trying is. And keep in mind that "I don't know" is not an acceptable answer.

**Readings:** There is no textbook for this course. There will, however, be occasional readings supplementing lecture material and others required for written essays and classroom discussions. These will be available on electronic reserve. To access electronic reserve:

- 1) Go to <<http://eres.usu.edu/courseindex.asp>>
- 2) Search by either Instructor Name, Course Name, or Course Number
- 3) Click on this class (WILD 2200)
- 4) Type in the password (**sch2200**)
- 5) Click on the material wanted
- 6) Then you can read it or, preferably, print it out

**Discussions:** Occasional class periods will be devoted to discussion of an issue decided on in advance. The topic may come from an assigned reading or directly from an issue we are discussing in class. The size of the class will create challenges for discussion, but not stop it. I expect participation in these discussions, and will grade for participation. It will not be a contest to see who can monopolize the discussion; all I expect is thoughtful participation. *In order to get credit for participating in discussions you must be in class, seated, and participating by 9:35 AM!*

**Written Assignments:** Several written assignments will also be required during the semester; in fact, each discussion will be linked to a writing assignment. Papers will be brief, with assigned limits ranging from 1–3 pages, depending on the topic. All papers must be typed (word processed). Grading will be based **on the logic and soundness of your**

**arguments, on scientific content, and on writing clarity.** As in the real world, knowledge is meaningless if you can not effectively and clearly communicate what you know.

**Exams:** There will be five exams, four midterms and a final. The final will be comprehensive, but the midterms will only cover material since the previous exam. Exams will be written and will include true-false, short answer, and a few essay questions. As with the written assignments, *you must write your answers carefully and clearly.* Full credit depends on an answer being concise, as well as complete with respect to the level at which the topic was presented in class. And we must be able to understand what you are saying.

In general, exams may be taken **only** during the assigned period. Only in the case of unusual, unforeseeable circumstances will I consider a makeup exam unless prior arrangements have been made with me. Additionally, prior approval is not guaranteed – you must have a valid reason for missing an exam.

**Academic (Dis)honesty:** This course will have zero tolerance of cheating and plagiarism. Read and believe the statement on “Academic Integrity – The Honor System” (<http://www.usu.edu/policies/PDF/Acad-Integrity.pdf>). If you have any question about what constitutes academic dishonesty, or what the consequences of dishonesty may be, see Article V, Section V-3, and Article VI, Section VI-5 of the USU Student Code (<http://www.usu.edu/studentervices/studentcode/>). In brief, academic dishonesty is not only grounds for failing the course, but potentially for being expelled from the University.

**Students With Disabilities:** If you have any disability that requires some accommodation, such as the use of a reader, note-taker, interpreter, alternatives to print media (e.g., Braille, large print, or audio format), or extra time for exams, the University and I are more than happy to accommodate you to the fullest extent possible. You must, however, document your disability and needs at the Disability Resource Center in University Inn 101 and talk to me as soon as possible.

**Grading:**

4 midterm exams, 50 pts. each	200
final	150
written assignments, 25 pts. each	50–75 (tentatively)
discussion participation, 10 pts. each	20–30 (tentatively)
<b>Total</b>	<hr/> 420–455 (tentatively)

Final grades will not be based on the actual total number of points possible (e.g., 455), but rather on the highest score made by a student this semester (perhaps only 439). In other words, the highest score made in the course will be considered a perfect score, and thus the "total number of points possible." Using this score as the maximum, I will then apply a 90–100% = A, 80–89% = B, etc. scale to assign grades. Depending on the scores, these cutoffs may be shifted up or down a little, but not much.

## TENTATIVE Course Outline

<u>Week(s)</u>	<u>Topic</u>
5 Jan, 12 Jan	<b>Introduction to Ecology and Science</b> Scope of Ecology, scientific method, "scientific truth," probability, statistics, etc.
19 Jan	<b>Basic Chemistry and the Building Blocks of Life</b> Chemical bonds, energy storage and use, major building blocks (e.g., proteins), etc.  <b>NOTE:</b> <i>19 January is a holiday – no class</i>  <b>Exam 1:</b> <u>Tentatively</u> Wednesday, 28 January ( <i>Intro, Science, and Basic Chemistry</i> )
26 Jan, 2 Feb	<b>Genetics and Evolution</b> DNA replication, origin of genetic variation, dominance, basic genetics, Natural Selection, genetic drift, genetic problems of small populations.
9 Feb, 16 Feb	<b>The Physical Environment</b> Fundamentals of climate, topography, soils  <b>Note:</b> <i>16 February is a holiday. No classes. BUT University-wide, Monday classes will be attended on Tuesday 17 February.</i>  <b>Exam 2:</b> <u>Tentatively</u> Friday, 27 February ( <i>Genetics and Evolution and the Physical Environment</i> )
23 Feb, 2 Mar	<b>Ecosystems</b> <u>Basic Aspects:</u> What they are, energy flow and nutrient cycling, trophic relationships, etc. <u>Applied Aspects:</u> Human alteration of the global N-cycle, climate change and productivity.  <b>Note:</b> <i>9 – 13 March is Spring Break! Go to southern Utah! Have a blast!</i>
16 Mar, 23 Mar	<b>Populations</b> <u>Basic Aspects:</u> Principles of population growth, limits to growth, etc. <u>Applied Aspects:</u> Human population growth and its consequences.
30 Mar, 6 Apr	<b>Species Interactions</b> <u>Basic Aspects:</u> Competition, predation, parasitism, and mutualisms. <u>Applied Aspects:</u> Human diseases, pollination of crops, etc.  <b>Exam 3:</b> <u>Tentatively</u> Wednesday, 1 April ( <i>Ecosystems and Populations</i> )
13 Apr, 20 Apr	<b>Communities, Disturbance, and Succession</b> <u>Basic Aspects:</u> Community organization, role of disturbance, succession, species richness <u>Applied Aspects:</u> Grazing as a disturbance, introduced species and cascading effects, etc.  <b>Exam 3:</b> <u>Will be</u> Friday, 17 April ( <i>Species Interactions and part of Communities</i> )

**Final Exam Is Scheduled For:** Wednesday, 29 April, 9:30-11:20 A.M.

**Note:** Exam dates are tentative. Exams will be given after the material expected for that exam is covered. For example, Exam 1 will be after we have covered energy and building blocks, no matter when that is.