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

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Class: MWF, 9:30-10:20, VSB 130

Gene’s Office Hours: MWF, 10:30-11:30; TR, 11:00-11:55 (except for occasional emergency absences)

If you cannot come at this time, please 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 short-answer 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 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.

Educational Objectives: I have three major, general learning objectives, partly, but not exclusively, driven by requirements for breadth life science courses at USU:

1) 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) 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 – livestock grazing, human population growth and resource consumption, agricultural practices, species introductions, or similar topics.

3) **Develop a basic understanding of Darwinian evolution.** To quote Theodosius Dobzhansky, the brilliant Russian geneticist and devout Eastern Orthodox Christian: “Nothing in biology makes sense except in the light of evolution” (1973, American Biology Teacher). There are millions of species on earth and at least most appear to be pretty well adapted to living their lives where and how they live – some in the ocean, some in tropical rain forests, 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.

*So in summary, this course will explore:*

1) **The Scientific Method,**
2) **The ecological relationships between organisms and their environments, and**
3) **The processes and outcomes of evolution.**

**IDEA Center Evaluation Objectives:**

22. Learning fundamental principles, generalizations, or theories **Essential**
23. Learning to *apply* course material (to improve thinking, problem solving, and decisions **Important**
31. Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view **Important**

**Format:** This will be a hybrid course. So what does that mean? It simply means that a variety of teaching/learning techniques will be used during the semester. To some extent I will take a “flipped classroom” approach where I will give you the information in advance. However, instead of pre-recorded lectures for you to listen to in advance, I will post my detailed notes on Canvas. I expect you to carefully study these notes *before* class. Then, in class I will fairly briefly review the notes with a PowerPoint presentation – repetition might be boring to some, but it really does help you learn. In class we will also work through problems – apply the material – maybe individually, maybe in groups,
maybe the whole class together. And all of this will be broken up by other activities such as occasional slide shows summarizing major topics, class discussion periods, the world famous “Friday Fun Fact!” series, and, of course, occasional exams.

Attendance will not be taken per se, but you are expected to attend all class meetings and participate in all activities. Your grade will reflect the effort you devote to this class. And you will be graded on participation (see below).

*Please feel free to ask questions at any time if you fail to understand something.* If I believe 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 present or do not respond, you lose 5 pts., if you offer a thoughtful answer, you get 5 pts. – 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. However, in addition to my notes (in a sense your textbook), there will be occasional readings supplementing lecture material, handouts, etc. that will be posted on Canvas for you to read.

**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 creates challenges for discussion, but does 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:** At least one written assignment will also be required during the semester; in fact, discussions will be linked to writing assignments. Papers will be brief, with assigned limits. All papers must be word processed. Grading will be based on: the logic and soundness of your arguments, scientific content, and writing clarity. As in the real world, knowledge is meaningless if you cannot effectively and clearly communicate what you know.

**Exams:** There will be four exams, three 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 fill-in-the-blank, true-false, short answer, and one or more longer “question(s)” such as a short essay or a problem to work through. As with 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.

Other Assignments: There also will be occasional short assignments to turn in based on activities or readings or videos or... Each will be worth 5-10 points.

Canvas: I am somewhat of a Luddite (look it up) so I will not use Canvas extensively. But I will use it to post notes, handouts, reading assignments, figures, keys to the exams (after the exam, of course), etc., and to send messages. So make sure you have set your notification preferences to what you actually regularly keep track of. And who knows – during the course I may move into the 20th century and use other features. But it is unlikely.

i>clicker: We will use i>clickers for a variety of purposes in this class, so if you do not have one, get one right away – you’ll be using it in other classes before you get out of here. You might be able to get one at the bookstore, but I would go to https://www1.iclicker.com/purchase and purchase either an i>clicker remote ($52.99) or the “REEF Polling by i>Clicker” app for your Android or Mac laptop and mobile devices (ranges from $14.99 for 6 months to $47.99 for 4 years). Or get it a little cheaper on Amazon. You will not need the capabilities of an i>clicker 2 in this class, but if you have one it will work fine. You should have your i>clicker or REEF app ready for action by 22 January or you risk losing participation points.

1) We will be using i>clickers for ‘polling’ questions about material we are covering – do you agree or disagree with a statement I make or an answer to a question another student provides? This will hopefully help stimulate thinking about the issues and will help me understand how many “get it.”
2) We might use them to ‘vote’ on such things as when to schedule review sessions before exams – a lot easier than counting hands.
3) I will use them to assess class participation.

To register your i>clicker remote go to https://www1.iclicker.com/register-clicker. You will be asked for your first name, last name, A#, and remote ID, which is located on the back of the i>clicker. If you are using REEF you will register it when you purchase the app and should be ready to go. At least that is my understanding.

Academic (Dis)honesty: This course will have zero tolerance of cheating and plagiarism. Read and believe the statement on “Academic Honesty/Integrity” (http://catalog.usu.edu/content.php?catoid=12&navoid=3140&hl=academic+dishonesty&returnto=search). 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 of the USU Student Code (https://studentconduct.usu.edu/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. However, you must document your disability and needs at the Disability Resource Center in University Inn 101 and talk to me as soon as possible. Without documentation, I cannot accommodate your needs.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>3 midterm exams, 50 pts. each</td>
<td>150</td>
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<tr>
<td>final</td>
<td>150</td>
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<tr>
<td>class participation</td>
<td>30</td>
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<tr>
<td>written assignments, 25 pts. each</td>
<td>25–75 (tentatively)</td>
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<tr>
<td>discussion participation, 5-10 pts. each</td>
<td>????????????????????</td>
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<tr>
<td>short assignment</td>
<td>????????????????????</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>Who knows? Keep track as we go</strong></td>
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Final grades will not be based on the actual total number of points possible (e.g. 435), but rather on the highest score made by a student this semester (perhaps only 429). 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 substantially.
# Tentative Course Outline

<table>
<thead>
<tr>
<th>Week(s)</th>
<th>Topic</th>
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<tbody>
<tr>
<td>8 Jan, 15 Jan, 22 Jan</td>
<td><strong>Introduction to Ecology and Science</strong>&lt;br&gt;Scope of Ecology, scientific method, &quot;scientific truth,&quot; probability, statistics, etc.</td>
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<tr>
<td>29 Jan</td>
<td><strong>Basic Chemistry and the Building Blocks of Life</strong>&lt;br&gt;Chemical bonds, energy storage and use, major building blocks (e.g., proteins), etc.</td>
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<tr>
<td>5 Feb, 12 Feb, 19 Feb</td>
<td><strong>Genetics &amp; Evolution</strong>&lt;br&gt;DNA, origin of genetic variation, basic genetics, Evolution and Natural Selection, genetic drift, genetic problems of small populations</td>
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<tr>
<td>26 Feb, 12 Mar</td>
<td><strong>The Physical Environment</strong>&lt;br&gt;Climate, topography, soils</td>
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<td>19 Mar, 26 Mar</td>
<td><strong>Ecosystems</strong>&lt;br&gt;<em>Basic Aspects:</em> Energy flow and nutrient cycling, trophic relationships, etc.&lt;br&gt;<em>Applied Aspects:</em> Human alteration of the global N-cycle, climate change and productivity?</td>
</tr>
<tr>
<td>2 Apr, 9 Apr</td>
<td><strong>Populations</strong>&lt;br&gt;<em>Basic Aspects:</em> Principles of population growth, limits to growth, etc.&lt;br&gt;<em>Applied Aspects:</em> Human population growth and its consequences</td>
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<tr>
<td>16 Apr</td>
<td><strong>Species Interactions</strong>&lt;br&gt;<em>Basic Aspects:</em> Competition, predation (herbivory), parasitism, and mutualisms&lt;br&gt;<em>Applied Aspects:</em> Human diseases, pollination of crops, etc.</td>
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<tr>
<td>23 Apr</td>
<td><strong>Communities, Disturbance, and Succession</strong>&lt;br&gt;<em>Basic Aspects:</em> Community organization, role of disturbance, succession, species richness&lt;br&gt;<em>Applied Aspects:</em> Grazing as a disturbance, introduced species and cascading effects, etc.</td>
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**Final Exam is scheduled for:** **Monday, 30 April, 9:30-11:20 A.M.**

**Note:** The first three 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 completed “energy and building blocks,” no matter when that is.