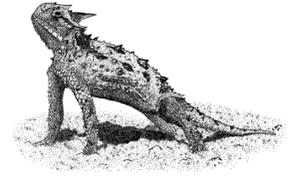


ECOLOGY (BIOL 4680/4682)

FALL 2010



Instructor: Dr. Marina M. Gerson

Office: N-272

Office Hours: Tues 1-2, Wed 12-1, Thurs 1-2

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Required Materials: iClicker (Used is fine. Register or re-register at iClicker.com. with your SID.)

Ecology: Concepts and Applications, 5th edition, by M. Molles (ISBN 9780073383224)

The Naturalist, 6th edition, by E.O. Wilson (ISBN 9781597260886)

COURSE DESCRIPTION and OBJECTIVES:

Ecology is the study of the relationships of organisms and their physical environments. It encompasses the study of individuals, populations of individuals, entire species and their interactions, community structures and relationships, ecosystem level functioning, and large-scale interactions. Ecological studies may be empirical, seeking out factual information on how organisms relate to their living on nonliving world; or, ecological studies may focus on applied topics, seeking guidelines for mitigation of human impacts and conservation of natural resources.

Ecology is a senior level course. It is a 4-unit lecture and laboratory course. It covers the basic interrelationships of plants and animals within their physical environments. General Ecology satisfies the ecology requirement for the major. The lab course (BIOL 4682) is corequisite. Prerequisites are BOTY 1050, ZOOL 1050, OR BIOL 1150 and statistics or calculus.

There will be required field trips over the course of the semester, during class times. You must dress appropriately for outdoor work (jeans, sneakers, and rain gear if stormy) on the field trips.

The objectives for this course are that all participants gain a working knowledge of 1) the major aspects that contribute to describing an organism's ecology, 2) the multi-level structure of ecological concepts, and 3) the theories that guide modern ecology research.

Knowledge of ecological concepts is important to the study of any living thing, and it is critical that we apply this knowledge if we are to support the persistence of the species and landscapes present on our planet today.

GENERAL ADVICE FOR THIS COURSE:

I believe that education is most successful and rewarding when there is a partnership between the instructor and each individual student. It is the student's duty to take personal responsibility for engaging actively with the resources provided in order to master the course material. Meanwhile, it is my responsibility to act as your facilitator for the learning process by providing clear goals and expectations, quality materials, coherent lectures that emphasize the information I believe is important to your training, and fair assessment of your learning. I also believe that it is my job as your instructor to challenge you. I want you to learn not only the basic facts and concepts in the field of Ecology, but I would like to see you develop as both professionals and scholars. I expect that my students are thoroughly involved both in my courses and in their education in general. The more each of you puts into this course the more all of us will get out of it; therefore, I expect this class to be high on your priority list, and I expect you to put in plenty of quality time and effort on it. Likewise, I will spend much effort in trying to make the course a valuable experience for you, whatever your career goals.



TENTATIVE SCHEDULE
(Lecture in White Boxes/Lab in Grey Boxes)

| WEEK | TOPICS | CHAPTERS (M =Molles; W=Wilson) |
|-------------------------------|---|---|
| Aug 23, 25, 27 | Syllabus; Introduction to Ecology Natural History: Life in Land | M1 M2 |
| Aug 23, 26 | Lab Safety and Introduction Set-up Plant Growth; Design data sheet | -- Plant Growth Lab |
| Aug 30, Sep 1, 3 | Natural History: Life in Water Natural History: Population Genetics and Natural Selection | M3 M4 |
| Aug 30, Sep 2 | Plant Data 1 Library Session | Library Assignment |
| Sep 6 Sep 8, 10 | Labor Day Holiday - NO CLASSES Adaptations to Environment: Temperature Relations Adaptations to Environment: Water Relations | -- M5 M6 |
| Sep 6* Sep 9 | Labor Day Holiday - NO CLASSES Plant Data 2; Population Growth Modeling | -- Popn Growth Models |
| Sep 13, 15, 17 | Adaptations to Environment: Energy & Nutrients Catch-up | M7 |
| Sep 13**, 16** | Plant Data 3; Introduction and Background Literature (1° Lit Exercise) Set up Mark/Recapture; Design data sheet | Mark & Recapture Lab Report Format |
| Sep 20, 22, 24 | Adaptations to Environment: Social Relations Population Ecology: Population Distribution & Abundance | M8 M9 |
| Sep 20, 23 | Plant Data 4 Mark/Recapture 1 Who is E.O. Wilson? | Please have started Wilson readings. |
| Sep 27, 29, Oct 1 | Population Ecology: Population Dynamics Population Ecology: Population Growth | M10 M11 |
| Sep 27, 30 | Plant Data 5; Methods Mark/Recapture 2; L-P Index | -- |
| Oct 4 Oct 6, 8 | MIDTERM 1 Population Ecology: Life Histories | M: 1-11; W: Prelude-6 M12 |
| Oct 4, 7 | Plant Data 6 Mark/Recapture 3 & Clean-up; Schnabel Index Mark/Recapture Analysis | -- |
| Oct 11 Oct 13 Oct 15 | Interactions: Competition Columbus Day Holiday - NO CLASSES Interactions: Exploitative Interactions | M13 -- M14 |
| Oct 11, 14 | Plant Data Analysis; Results, Discussion, Title | -- |
| Oct 18, 20, 22 | Interactions: Mutualism Catch-up | M15 |
| Oct 18**, 21** | Quadrat & Transect Sampling - FIELD TRIP | Plant Diversity Sampling |
| Oct 25, 27, 29 | Communities and Ecosystems: Species Abundance/Diversity | M16 |
| Oct 25, 28 | Quadrat & Transect Sampling Analysis BRING SOIL | W: 10 |
| Nov 1, 3, 5 | Comm and Ecosys: Species Interactions & Community | M17 |
| Nov 1, 4 | Soil Ecology | Soil Ecology Lab |
| Nov 8, 10, 12 | Comm and Ecosys: Primary Production & Energy Flow Communities and Ecosystems: Nutrient Cycling & Retention | M18 M19 |
| Nov 8 Nov 11 | Population Growth Modeling Veteran's Day Holiday - NO Thursday lab | Popn Growth Models -- |
| Nov 15, 17, 19 | Communities and Ecosystems: Succession and Stability | M20 |
| Nov 15, 18 | Presentations; Professional Development Exercise | Prof Dev Exercise |
| Nov 22 Nov 24 | MIDTERM 2 Large-Scale Ecology: Landscape Ecology | M: 12-20; W: 7-14 M21 |
| Nov 22, 25 | No Labs This Week Due to Thanksgiving Holiday | -- |
| Nov 29, Dec 1, 3 | Large-Scale Ecology: Geographic Ecology Large-Scale Ecology: Global Ecology | M22 M23 |
| Nov 29, Dec 2 | Presentations; Landscape Ecology Exercise | Landscape Ecology |
| Dec 6, 8 | Catch-up | -- |
| Dec 6, 9 | Presentations; Eco-Friendly Lifestyle Follow-up | -- |
| FINAL EXAM | Monday December 13, 11:15-1:15 | M: 1-23, W: 1-18 |

*Must check plants outside of class time this week

** Lab is outdoors



ASSESSMENT METHODS, GRADES and GRADING:

As an upper division capstone course for the Biology major, it is important for students in this class to demonstrate both mastery of factual content and the ability to synthesize ideas based on the theories discussed in the class. This course also provides training in science communication through both lab and lecture assignments. Your grade will be based on small assignments, mixed-format lecture exams, the production of a term paper, and an in-class presentation. There are opportunities for Extra Credit, as discussed below. Assignment information will be available on the Blackboard site. Lab and lecture points are combined for a single grade in the course. I do not use a curve. The course is graded with plusses and minuses.

A (>924), A- (900-924), B+ (875-899), B (825-874), B- (800-824), C+ (775-799), C (725-774), C- (700-724), D+ (675-699), D (625-674), D- (600-624), F (<600)

| <u>ASSIGNMENT</u> | <u>LECTURE/LAB</u> | <u>ANTICIPATED DUE DATE</u> | <u>POSSIBLE POINTS</u> |
|------------------------------------|--------------------|------------------------------|------------------------|
| Lecture Participation | Lecture | Throughout semester | 50 |
| Lab assignments | Lab | Throughout semester | 250 |
| Library Assignment | Lab | September 8 (M), 9 (Th) | 30 |
| Primary Literature Exercise | Lab | September 20 (M), 23 (Th) | 30 |
| 2 Midterms | Lecture | Oct 4 & Nov 22 | 200 |
| <i>Naturalist</i> Discussion Board | Lecture | Oct 4, Nov 22, Dec 13 | 60 |
| Survey of Topic* | Lecture | October 15 | 30 |
| Primary Literature* | Lecture | November 5 | 40 |
| Paper Presentation* | Lab | Nov 15, 18, 29, Dec 2, 6, 9 | 80 |
| Outline for term paper* | Lecture | November 19 | 30 |
| Term Paper* | Lecture | December 3 | 100 |
| Comprehensive Final | Lecture | December 13 | 100 |
| | | TOTAL POSSIBLE POINTS | 1,000 |

*Associated with Term Paper

Notes on Grades and Assignments

- Ten points will be deducted for each day of lab class missed.
- In general, any homework or extra credit assignment should be turned in on the day and time it is due.
- I know that things happen outside of school. For this reason, you may turn in one assignment up to three days late without penalty.
- Exams must be taken as scheduled unless you have made a prior arrangement with me.
- Following the return of any graded assignment, you have fourteen days in which to dispute any grade discrepancies. To dispute the scoring of an assignment, bring the assignment and supporting information showing why you deserved a different grade to my office, where we can discuss the issue privately.
- At the prerogative of the instructor, non-compliance with field trip regulations or topics under Expectations of Students may result in partial or total loss of the extra credit option.

Exams

There will be two midterms and a comprehensive final. Each midterm exam will consist of approximately 10 short answer questions and 2-3 longer essays/problems. The comprehensive final will consist of approximately 20 short answer questions and 4-6 longer essays/problems, with an emphasis on new material. One week prior to each exam, I will provide you a list of essay questions. A subset of these questions will appear on the exam. Some will be required; for others you will have a choice to select from. The short answer questions will come directly from the full-length essay questions that do not appear on the exams. New short-answer questions relating to *The Naturalist* will also appear on each exam.

The Naturalist Discussion Board

This is the memoir of a important ecologist who has had a long and highly successful career. I selected this book for several reasons: 1) it gives insight into the ways in which the field of ecology has changed over the course of the past sixty years, 2) it provides an array of interesting facts about living things and the study of living things, and 3) it's pretty entertaining!

So where do the points come from? The assigned chapters are due at each exam date. For each of the three periods of time, make three unique, thoughtful postings on the discussion board. Your unique postings are due before the exam time. Your post can comment on the reading or on another person's post. It must contain some substance, so it cannot simply be an affirmation of someone else's post. For example, you cannot just respond to another post with "I agree!" or "I disagree!" You should fully explain your position. **In general, posts should be at minimum of five sentences long. Don't forget our culture of respect for our classmates.** If you do disagree, please explain your opposing position politely.

Lecture Participation

You earn participation points by using your iClicker. Questions will appear from the beginning through the end of class each day. Some questions will be opinion-based and have no "right" answer; others will be objective questions designed to indicate your level of knowledge. You can fail to respond to one question each day and still get full credit. You can also select the wrong response to 25% of the objective questions and still get full credit. If you miss more, then you will earn 80% of the credit for the day. I will drop your six lowest class days, so you can also afford to miss class several times if unforeseen circumstances arise.

Lab Assignments

Be sure to bring the appropriate lab exercise to class each week. There will be both formal and informal activities in lab that will contribute to your overall lab score. On some occasions, I will collect these exercises; other times, I may simply record your participation in the activity. Each day that you miss lab will result in a loss of ten points from your lab score.

Formal Exercises: Library Assignment & Primary Literature Exercise

These formal assignments are designed to give you the research skills you will need in order to complete the term paper.

Term Paper and Related Assignments

Topic Selection – The topic list will be available prior to sign-ups. Topic selecting will occur in lab during the week of Sept 27 & 30. Each student will draw a number at the beginning of class, and then sign-ups will occur according to this numerical order. Be sure to have three or four preferred topics in mind.

Survey of Topic – You will submit a type-written 2–3 paragraph summary of information on your topic, citing at least five properly-formatted sources of useful information. These sources can be websites, encyclopedias, books, magazine articles, or scientific literature. The objective of the assignment is to give you a broad overview and basic information about your subject in preparation for understanding the primary literature.

Primary Literature for Term Paper – Find five primary literature articles that will be useful in producing your term paper. For *each* article, a) provide a properly-formatted reference, b) summarize useful background information from the Introduction, c) state the purpose of the work done by the authors, and d) summarize the important findings reported in the paper. The purpose of this activity is to direct you in collecting suitable sources for the writing of your term paper.

Outline for Term Paper – The objective of this assignment is to help you organize the structure of your term paper and to allow you to receive feedback on general content before submitting your final paper. You should follow a standard outline format (see external links on Blackboard for example outline formats). Please note that you are not completing a thesis-based project, so **do not** include a thesis statement.

Paper Presentation – These presentations are intended to give you practice at relating scientific information about modern ecological studies. You and a partner will jointly present the findings of a scientific paper that you select. The paper should be at least generally related to your term paper topics. The presentation can be done in PowerPoint, or in a more creative format, but should fit a time frame of 13–17 minutes, with 3–5 minutes for questions. Details of this assignment will be posted on BlackBoard later in the semester.

Term Paper – You have some flexibility in producing your term paper. You can choose to focus more deeply on a narrow aspect of your topic or you may survey the breadth of your topic with less depth. You are not required to use all of the papers submitted in the primary literature exercise, if some of the papers don't fit into your final scope. In general:

- Minimum number of references: 5 primary literature articles and one secondary literature source.
- Use as many resources as you need to cover the topic thoroughly, including books, magazine articles, and **reliable** web resources
- 8–15 pages (a guideline, not a fast rule)
- Double-spaced computer-printed
- Spelling and grammar do count
- Organization:
 - o Introduction to topic area
 - o Body of the report (extremely variable due to breadth of topics)
 - o Some sort of final thoughts or conclusions
 - o Properly formatted Literature Cited section
- You may intersperse any figures or tables through the body of the paper

EXPECTATIONS OF STUDENTS

- **Engage the course material** through participation in class, reading the text, and thinking about genetics outside of class.
- **Be respectful of others** by arriving on time, giving your attention to whoever is presenting, listening to the ideas of your classmates, turning off cell phones, and generally being polite. This also means no text-messaging (yes, the person at the front of the room *can* tell what you are doing) and no internet surfing (it's distracting to those sitting around you).
- Students are expected to **take exams** on days and times scheduled. If you have a legitimate excuse to miss, I need to know the reason, in writing, before the exam date. If you have an emergency, you must let me know of the emergency as soon as you can. I will determine the appropriateness of taking the missed exam.
- **Maintain your academic integrity.** *Your integrity is your most valuable asset as a student* and in your future career as an educated person. In line with this, it is the policy of the Department of Biological Sciences that anyone caught *cheating* or *plagiarizing* will receive a grade of F for the course. I reserve the right to request any student suspected of cheating to take a second, different exam on the material. Protect yourself by making your integrity obvious.

EXPECTATIONS OF THE INSTRUCTOR

- Same as those for students, in terms of engagement in the course, respect for participants. I do my best to protect your privacy and maintain an environment in which you can learn.
- Be **open to feedback** on the course and be flexible in order to make appropriate changes to meet student needs.
- Be **fair and consistent in assessment** of student learning.
- Be **available to students** outside of class time to answer questions and discuss class material.

FORMAL EXTRA CREDIT OPPORTUNITIES

A **maximum of 35 Formal Extra Credit Points** may be **attempted** during the semester. These points are added to your point total for the course. Additional, less formal extra credit opportunities may arise during the semester.

Ecology in the News

Over the course of the semester, **find and share with the class** one ecologically-related news story. The story should have something to do with ecology as the primary focus of the story. The news **story must be fresh** (same week (seven days) for a daily news source, same month for a monthly news source such as a magazine).

Type a 1–3 paragraph summary of the story. Include a **full reference citation** of your source in your write-up. This should include: author, date, title of the article, and name of the source (like the name of the newspaper, magazine, web news source including page title and URL, or radio show).

While your story is still fresh, share it with the rest of the class. Just let me know at the beginning of the class that you have a news story for us. Multiple students may present stories on the same day, even if they are the same exact story; however, once a story has been presented, it cannot be presented again on a subsequent day. So, when you find an interesting news story, get your summary ready for presenting right away!

15 points per news item, up to 30 points total. You may only present one article on any particular day.



Ecologically Friendly Lifestyle

- Make a change in your lifestyle to reduce your impact on our planet.
- During the first two weeks of class, examine your own behaviors and determine a small change you can make in your lifestyle to better our planet.
- Your lifestyle change should be something practical, so that you can be a success. Some examples include: getting your household to take recycling seriously; bicycling to school/work instead of driving; carpooling with a friend; choosing eco-friendly products/packaging; joining and participating in an organization that better the environment. Be creative! There are lots of ways to reduce your impact on the world around you.
- Commit to your lifestyle change for the duration of the semester.
- **By September 3, submit a short paragraph** explaining: a) the change you are making, b) how it will reduce your impact on the environment, c) how you will log your activity, d) how you will **quantify** your effort.
- **You must keep track of your progress** (dates and activities logged) through the semester.
- **An evaluation of your effort is due on December 6.** The evaluation should be typed and should include a) **quantified** evaluation of the **value** of your effort in terms of impact on the environment, b) an evaluation of how successfully you followed your resolution, c) a personal evaluation as to how easy/difficult your change was and why, and e) whether you plan to keep up the change and to what degree. Also submit your log of activities.
- 35 points for a successful lifestyle change, partial credit for a good effort!