

ECOLOGY (BIOL 4680-001)
FALL 2014



Instructor: Dr. Marina M. Gerson

Office: N-272

Office Hours: Mon. & Wed. 12-12:30, Thur. 1-3, and by appointment

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Required Materials: iClicker (Used is fine. Roll-call register in class.)

Ecology: Concepts and Applications, 6th edition, by M. Molles (ISBN 9780073532493)

TENTATIVE SCHEDULE

WEEK	TOPICS	CHAPTERS
Aug 22*	Syllabus; Introduction to Ecology	1
Aug 25, 27, 29	Natural History: Life on Land	2
Sep 1 Sep 3, Sep 5	Labor Day Holiday - NO CLASSES Natural History: Life in Water	-- 3
Sep 8 Sep 10 Sep 12	Natural History: Population Genetics and Natural Selection Adaptations: Temperature Relations	4 5
Sep 15 Sep 17 Sep 19	Adaptations: Water Relations Adaptations to Environment: Energy & Nutrients	6 7
Sep 22 [†] Sep 24 Sep 26	Adaptations to Environment: Social Relations Population Ecology: Population Distribution & Abundance	8 9
Sep 29, Oct 1 Oct 3	Population Ecology: Population Dynamics Catch-up	10 1-10
Oct 6 Oct 8 Oct 10	MIDTERM 1 Population Ecology: Population Growth Mini-Break - NO CLASSES	1-10 11 --
Oct 13 Oct 15, 17	Population Ecology: Population Growth (cont.) Population Ecology: Life Histories	11 12
Oct 20 Oct 22, Oct 24*	Interactions: Competition Interactions: Exploitative Interactions	13 14
Oct 27 Oct 29 Oct 31	Interactions: Mutualism Communities and Ecosystems: Species Abundance/Diversity	15 16
Nov 3 Nov 5, Nov 7*	Comm and Ecosys: Species Interactions & Community Comm and Ecosys: Primary Production & Energy Flow	17 18
Nov 10 Nov 12 Nov 14	Communities and Ecosystems: Nutrient Cycling & Retention Communities and Ecosystems: Succession and Stability	19 20
Nov 17* Nov 19 Nov 21	Communities and Ecosystems: Succession and Stability (cont.) Catch-up	20 --
Nov 24 Nov 26 Nov 28	MIDTERM 2 Large-Scale Ecology: Landscape Ecology Thanksgiving Holiday - NO CLASSES	11-20 21 --
Nov 1 Dec 3 Dec 5*	Large-Scale Ecology: Geographic Ecology Large-Scale Ecology: Global Ecology	22 23
Dec 8 Dec 10	Catch-up Reading Day - NO CLASSES	--
FINAL	Friday, December 12 from 11:15 am-1:15 pm	1-23

*Something is due. Check the assignment schedule.

[†] Term paper topic sign-ups in class.

COURSE DESCRIPTION and OBJECTIVES:

Prerequisites: BIOL 1050 & 1150 (or BOTY 1050 & ZOOL 1050) and statistics or calculus. The lab course (BIOL 4682) is corequisite.

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.

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.

Course Objectives

Students completing the course will be able to explain and apply foundational concepts in ecology:

- Interactions between organisms and their environments exist at each level of biological organization.
- Living things are constrained by physical laws.
- Random processes influence the evolution of populations, while natural selection promotes adaptive qualities of individuals.
- Ecological systems reveal complex relationships.
- Both genetic and environmental influences determine the responses of living things.

Student Learning Outcomes

Successful students will be able to:

- Give examples of morphological, physiological, and behavioral traits of individuals that mediate the hardships of the environment.
- Explain how individual fitness is influenced by evolutionary, developmental, and environmental constraints.
- Predict the outcomes of exploitation, competition, and mutualism, based on population traits.
- Deduce underlying reasons for the distributions of individuals in populations.
- Explain how the shape, tilt, rotation and revolution of the Earth itself result in the distributions and life histories of living things on our planet.
- Trace the flow of energy and the cycling of materials through an ecosystem, identifying the trophic roles of each population
- Identify details in which energy budgets of individuals vary, within populations and between species.
- Give examples of ways in which islands have been ideal settings for studies of biodiversity and evolution.
- Provide examples of experimental and observational evidence for the evolution of populations and the ecological processes responsible.
- List specific factors that result in the dynamics of populations.
- Explain examples in which populations vary in individual importance to community structure.
- List several ways in which, at both the local and global levels, humans negatively impact the biosphere beyond the scale of any other single species, often in unpredicted ways.
- Explain how biodiversity influences ecosystem processes.
- Discuss the broadly predictable patterns in which ecological systems develop over time.
- Identify aspects of life history that are constrained by the evolutionary past and those which are flexible to respond to the environment.
- Give examples of ways in which specific environmental conditions can influence the outcome of interactions between individuals or populations.

Students will also demonstrate the ability to:

- Choose and apply appropriate ecological methods of study.
- Use ecological models to make predictions and explore ecological interactions.
- Calculate ecological descriptive statistics from raw data sets.
- Develop hypotheses and appropriate experiments for testing the hypotheses.
- Analyze experimental data using appropriate statistical tests to evaluate hypotheses.
- Produce written papers in both the primary and secondary literature formats.
- Make connections between ecological concepts and everyday life.

Dr. Gerson's 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 make the effort to make the course a valuable experience for you, whatever your career goals.



EXPECTATIONS OF STUDENTS

- **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).
- **Engage the course material** through participation in class, reading the text, and thinking about ecology outside of class.
- 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. Please protect yourself by making your integrity obvious.

EXPECTATIONS OF THE INSTRUCTOR

- Same as those for students, in terms of respect for participants and engagement in the course. *Protecting your privacy and maintaining an environment in which you can learn are my top priorities.*
- 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 and provide appropriate feedback to facilitate improvement.
- Be **available to students** outside of class time to answer questions and discuss class material.

Special circumstances: I understand that unusual circumstances can temporarily alter your availability for our class. If you know ahead of time that you will have a conflict on an important day, please get in touch with me as soon as possible. If an unforeseen incident causes you to miss an exam or due date, get in touch with me *as soon as your circumstances allow*. If you miss a regular class day, please get the notes from a friend, review the posted lecture notes, and come to my office hours with any questions you may have.

Learning styles and needs: As an instructor, I believe that part of my job is to intentionally facilitate the success of students with different learning styles and needs, and I do my best to incorporate multiple ways of learning into my courses and assignments. Please meet with me privately *as soon as possible* if there are particular accommodations that will foster your individual success in this course.

TUTORING ON CAMPUS – Free tutoring services are available to assist you in most disciplines, including in biology! Library 112; Phone (209) 667-3642; Web <http://www.csustan.edu/Tutoring>

CAMPUS COUNSELING SERVICES – Overwhelmed by the stress of juggling classes and your home life? Our campus offers **excellent** counseling services to help support you! MSR 210; Phone (209) 667-3381; Web <http://www.csustan.edu/Counseling/>

STUDENT HEALTH CENTER – You have already paid for access to health care on campus. Services include: birth control, flu shots, immunizations, pharmacy, check-ups, HIV testing, TB tests, and *doctor's notes for when you are sick*! Phone (209) 667-3396; Web <http://healthcenter.csustan.edu>

LIBRARY – Our reference librarians enjoy helping you to find resources! You can get help in person at the Reference Desk, or by phone or chat (scan left side of library main webpage). Phone (209) 667-3233; Web <http://library.csustan.edu>

ASSESSMENT METHODS, GRADES and GRADING:

As an upper division 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, lecture quizzes and clicker participation, mixed-format lecture exams, lab reports, and the production of a term paper. There are opportunities for Extra Credit. 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 pluses 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)

ASSIGNMENT	ANTICIPATED DUE DATE	POSSIBLE POINTS	% OF GRADE
Syllabus Exercise	August 22	5	0.5%
Lecture Participation w/iClicker	Throughout semester	75	7.5%
2 Midterms	Oct 6 & Nov 24	250	25%
Survey of Topic*	October 24	20	2%
Primary Literature*	November 7	40	4%
Outline for term paper*	November 17	20	2%
Term Paper*	December 5	100	10%
Comprehensive Final	December 12	125	12.5%
Laboratory Points	Throughout semester	365	36.5%
	TOTAL POSSIBLE POINTS	1,000	

*Associated with Term Paper

Notes on Grades and Assignments

- In general, any homework or extra credit assignment should be turned in on the day and time it is due.
- Late Pass! I know that things happen outside of school. For this reason, you may turn in one assignment up to three days late without penalty. Saturday and Sunday count towards the three days. Any other late work will be penalized 10% per day. You can send an e-version to “date-stamp” work, if you must miss class, but please submit a hardy copy when you return to campus.
- Exams must be taken as scheduled unless you have made a prior arrangement with me.
- Following the return of any graded assignment, you have seven 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.
- Sample rubrics to be used when grading assignments are available for viewing on our BlackBoard site.

Exams

There will be two midterms and a comprehensive final. The exams will be open book and open note, but laptops, tablets, and smart phones will not be allowed. If you don't have a good grasp of the material, you will be unable to complete the exam in the time allotted. 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. Some questions will be required; for others you will have a choice to select from.

Lecture Participation using iClicker

You earn points by using your iClicker to participate each day in class. 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. Your participation with your clicker will help me to gauge the level at which I need to cover each new topic and helps to keep you awake, too! I know that sometimes things come up. Don't worry: you will be able to miss three days of clicking without penalty.

Term Paper and Related Assignments

Topic Selection – The topic list will be available prior to sign-ups. Topic selecting will occur in lecture on Sept 22. 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.

Term Paper – You will submit your term paper on BlackBoard using the Turn It In tool. Please aim for <15% plagiarism on your originality report. 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:
 - Introduction to topic area
 - Body of the report (extremely variable due to breadth of topics)
 - Some sort of final thoughts or conclusions
 - Properly formatted Literature Cited section
- You may intersperse any figures or tables through the body of the paper

FORMAL EXTRA CREDIT OPPORTUNITIES

A **maximum of 20 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!

6 points per news item, up to 18 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 Friday, September 5, 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 regular track of your progress** (dates and activities logged) through the semester.
- **An evaluation of your effort is due in lecture on Monday, December 8** . 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) an 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.
- 20 points for a successful lifestyle change, partial credit for a good effort!