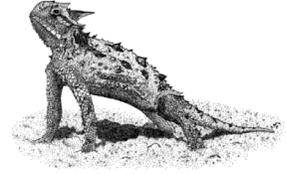


# ECOLOGY (BIOL 4680 Lecture and Lab)

## FALL 2018



**Instructor:** Dr. Marina M. Gerson

**Office:** N-272

**Office Hours:** Tuesday 10–11:30, Wednesday 10–11:30, & by appointment

**Contact Information:** my office, mgerson@csustan.edu or (209) 664–6547

**Required Materials:** *iClicker* (Used is fine. Free roll-call registration in class.)

*Ecology: Concepts and Applications*, 8<sup>th</sup> edition, by Molles and Sher (ISBN 9781259880056)

(Note, it would be okay to have the 7<sup>th</sup> edition, if you can find a good used copy.)

*Stan State Blackboard course site*

### COURSE DESCRIPTION and OBJECTIVES:

Prerequisites: BIOL 1050 & 1150 **and** CHEM 1100 & 1110 **and** statistics or calculus.

Ecology is the study of the relationships of organisms and their physical environments. It includes 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.

### 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 quizzes** on days and times scheduled. If you have a legitimate excuse to miss, I need to know the reason, in writing, before the quiz 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 quiz.
- **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.

## 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.
- Make connections between ecological concepts and everyday life.

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**TUTORING ON CAMPUS** – Free tutoring and writing help 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! Library 185; 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>

**TENTATIVE SCHEDULE (shaded boxes are labs)**

<b>DATES</b>	<b>TOPICS</b>	<b>CHAPTERS/PRINT OUTS</b>
Aug 23	Syllabus; Introduction to Ecology	1
Aug 28, 30	Natural History: Life on Land	2
Aug 27*, 29*	Lab Safety, Introduction, Make outdoor observations	--
Sep 4, 6	Natural History: Life on Land Natural History: Life in Water	2 3
Sep 3, 5	Let's go hybrid!: Online intro & Library Assignment	Library Assignment
Sep 11 Sep 13 <sup>Q</sup>	Natural History: Life in Water <b>Quiz 1</b> Population Genetics and Natural Selection	3 1-3 4
Sep 10, 12	Assignment due at the beginning of lab Design Germination Experiment Set up Population Growth & Competition Lab	Germination Lab Population Growth Lab
Sep 18, 20	Adaptations: Temperature Relations Adaptation: Water Relations	5 6
Sep 17, 19	Set up Germination Experiment Collect Population Growth Data 1	Germination Lab Population Growth Lab
Sep 26 Sep 27 <sup>Q</sup>	Adaptations to Environment: Energy & Nutrients <b>Quiz 2</b> Adaptations to Environment: Social Relations	7 4-7 8
Sep 24, 26	Collect Germination Data <i>(Lab Report Option 1)</i> Collect Population Growth Data 2 Discuss Lab Reports	Germination Lab Population Growth Lab
Oct 2, 4	Population Ecology: Population Distribution & Abundance Population Ecology: Population Dynamics	9 10
Oct 1*, 3*	Collect Population Growth Data 3 (Lab Report Option 2) Set up Mark & Recapture Lab	Population Growth Lab Mark & Recapture Lab
Oct 9, 11	Population Ecology: Population Growth	11
Oct 8	Monday: Mark & Recapture Lab - Data collection 1	Mark & Recapture Lab
Oct 10	<b>Wednesday: No classes all day</b>	--
Oct 16 <sup>Q</sup> Oct 18	<b>Quiz 3</b> Population Ecology: Life Histories Interactions: Competition	8-11 12 13
Oct 15, 17	Mark & Recapture Lab - Data collection, Analysis, Clean up	Mark & Recapture Lab
Oct 23 <sup>TP</sup> , 25	Interactions: Exploitative Interactions	14
Oct 22, 24	Bring soil from home Functional Reponse of Mosquitofish (Lab Report Option 3) Field Trip Preparation	Functional Response Lab
Oct 30 Nov 1 <sup>Q</sup>	Interactions: Mutualism <b>Quiz 4</b> Communities and Ecosystems: Abundance/Diversity	15 12-15 16
Oct 29*, 31*	<b>FIELD TRIP: Optimal Foraging Lab</b>	Optimal Foraging Lab
Nov 6, 8	Comm and Ecosys: Species Interactions & Community Comm and Ecosys: Primary Production & Energy Flow	17 18
Nov 5, 7	Soil Ecology Lab	Soil Ecology Lab
Nov 13 <sup>TP</sup> , 15	Communities and Ecosystems: Nutrient Cycling & Retention	19
Nov 12	<b>Veteran's Day Holiday - No classes all day</b>	--
Nov 14*	<b>FIELD TRIP: Quadrat &amp; Transect Sampling of Plants</b>	Sampling Techniques Lab
Nov 20 <sup>Q</sup> Nov 22	<b>Quiz 5</b> Communities and Ecosystems: Succession and Stability <b>THANKSGIVING HOLIDAY - no classes</b>	16-19 20 --
Nov 19*	<b>FIELD TRIP: Quadrat &amp; Transect Sampling of Plants</b>	Sampling Techniques Lab
Nov 21	<b>Classes are in session, but no Wednesday lab today</b>	--
Nov 27 <sup>TP</sup> , 29	Large-Scale Ecology: Landscape Ecology Large-Scale Ecology: Geographic Ecology	21 22
Nov 26, 28	Quadrat & Transect Analysis	Sampling Techniques Lab
Dec 4 Dec 6 <sup>Q</sup>	Large-Scale Ecology: Global Ecology <b>Quiz 6</b>	23 20-23
Dec 3*, 5*	Ecology as a Science	
Dec 11	<b>Reading Day - No More Classes - TERM PAPER DUE by 2 pm</b>	--
<b>OPTIONAL FINAL EXAM</b>	<b>Tuesday, December 18, 11:15-1:15</b>	1-23

TP - A Term Paper assignment is due in lecture.

\* 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, lecture quizzes and clicker participation, mixed-format lecture exams, lab reports, and the production of a term paper. There may be 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)

<u>ASSIGNMENT</u>	<u>LECTURE/LAB</u>	<u>ANTICIPATED DUE DATE</u>	<u>POSSIBLE POINTS</u>
Syllabus Exercise	Lecture	August 23	5
Lecture Participation w/iClicker	Lecture	Throughout semester	70
Lab participation & assignments	Lab	Throughout semester	150
Formal Lab Report	Lab	Varies depending on choice	85
6 Quizzes	Lecture	9/13, 9/27, 10/16, 11/1, 11/20, 12/6	510
Survey of Topic*	Lecture	October 23	20
Primary Literature*	Lecture	November 13	40
Outline for term paper*	Lecture	November 27	20
Term Paper*	Lecture	December 11 by 2pm	100
			<b>TOTAL POSSIBLE POINTS 1,000</b>

\*Associated with Term Paper

### Notes on Grades and Assignments

- Twenty 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. 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 hard copy when you return to campus.
- Quizzes 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 loss of participation credit for that activity.

**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.

### **Quizzes**

**There will be 6 quizzes worth 85 points each.** The quizzes will take place at the beginning of class, and you will have 20 minutes to complete the quiz. Quizzes will be primarily multiple choice with 1-2 short answer responses. Regular lecture will follow the quiz. Quizzes will include recently covered material and will not include questions from chapters/material not yet covered. Some content builds on prior knowledge, so some questions may feel comprehensive, building on content included in previous quizzes.

### **Optional Comprehensive Final Exam**

If you are satisfied with your quiz scores, you may opt out of the Final Exam. ***If you choose to take the comprehensive Final Exam, it will replace your two lowest quiz scores.***

### ***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.

### ***Lab Assignments and Lab Reports***

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 twenty points from your lab score.* To practice writing in the style of primary literature, you will complete one formal lab report, from three possible choices. Your lab report will be worth 85 points. Lab reports are due at the beginning of lab, two weeks after the final data collection.

### ***Term Paper and Related Assignments***

This assignment provides you the opportunity to practice your library research skills, scientific reading, and secondary literature writing while exploring an area of ecology that is of particular interest to you. Many small assignments build into your term paper, which you will submit through a Turn It In link on our Blackboard course site. Be sure to pick a topic that you really want to learn more about!

*Topic Selection* – The topic list will be available prior to sign-ups. Topic selecting will occur in lab during the week of Oct 15 & 17. 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 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
- 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

