GENERAL ECOLOGY/GEN. ECOL. LAB -- BIOL 3030/3035

Lecture: MWF 9:00-9:50 a.m. MC 210
Lab: Section 1: Monday 2:00-4:50 P.M. SC 125 **Lab fee:** $35
Section 2: Friday 2:00-4:50 P.M. SC 124
Instructor: Dr. Mark Grover **E-mail:** grover@suu.edu **Phone:** 586-7928
Office: SCI 113 **Office hours:** Wednesday 8-9, Thursday 10-11, 1-4, Friday 12-1.

Text: Molles, M. C., Jr. 2004. Ecology: Concepts and Applications. McGraw-Hill Co., New York. Appropriate chapters for each topic are listed in the syllabus below.

Additional reading: It is likely that you will be given some supplemental reading, in the form of journal articles on hot topics in ecology. PDF files of the articles will be available on the student drive (G:) of the SUU network under Classes\Grover\Ecology\Articles. The reading assignments will be announced in class and the files will be placed on the G-drive well in advance of the discussion of the topic. In addition, I will provide notes that complement discussion material on WebCT and on the G-drive (under the folder Classes\Grover\Ecology\Lectures). The file names for these notes will correspond to the topics. You will need to use an SUU computer to access material on the G-drive. However, you can save the files to an external drive or disc and view them at your own convenience at home. WebCT can be accessed anywhere.

BIOL 3030 Syllabus

Course Description: An introduction to the principles and concepts of ecology, with emphases on ecosystem structure and function, the dynamics and regulation of populations, species interactions, patterns of species diversity and habitat associations, evolutionary ecology, and the application of ecological principles to conservation biology. Lectures will be interactive and will emphasize critical thinking and group discussion.

Date	Lecture Topic	Reading in Molles
Aug 29	Ecology and the scientific method	Ch. 1
	Global & Ecosystem Ecology	
Aug 31	An overview of experimental ecology	
Sept 2	A brief history of the planet Earth	Ch. 23
Sept 5	**Labor Day**	
Sept 7	Climate and the biosphere	
Sept 9	Ecology and geography of terrestrial biomes	Ch. 2
Sept 12	Overview of marine environments	Ch. 3
Sept 14	Freshwater environments	
Sept 16	Energy flow & trophodynamics	Ch. 18
Sept 19	Nutrient cycles & climate change	Ch. 19
Sept 21	Soil -- development, profile differentiation, & classification	
Sept 23	Succession and ecosystem function	Ch. 20
Sept 26	Disturbance, succession, and species diversity	
Sept 28	*Review for Exam 1*	
Sept 30	**Exam 1**	
	Physiological Ecology	
Oct 3	Temperature regulation & energetics	Ch. 4
Oct 5	Photosynthetic pathways, water, & osmoregulation	Ch. 5-6
	Natural selection, evolution, and speciation	Ch. 8
Oct 7	Natural selection and evolutionary ecology	

Oct 10	Speciation – causes and ecological consequences	
	Population Ecology	Ch. 9-12
Oct 12	Demography – Age structure, mortality, & survivorship	
Oct 14	Life history strategies	
Oct 17	Environmental factors & variability in life history	
Oct 19	Population dynamics -- exponential & logistic growth	
Oct 21	Density-dependent mortality & growth; Regulation of populations	
Oct 24	**Harvest Break**	
Oct 26	Stochasticity & chaos in population dynamics; *Brief review for Exam 2*	
Oct 28	**Exam 2**	
	Community Ecology I – The community concept and competition	Ch. 13
Oct 31	Ecological communities in space and time	
Nov 2	The niche and the concept of limiting similarity	
Nov 4	Interspecific competition	
Nov 6	Evolutionary consequences of competition	
	Community Ecology II – Food webs, foraging, and predation	
Nov 9	Food webs – structure & function	Ch. 17
Nov 11	Functional Response curves & Optimal foraging theory	
Nov 14	Predator-prey interactions – offense and defense	Ch. 14
	Community Ecology III – Mutualism	
Nov 16	Mutualism in ecological communities	Ch. 15
Nov 18	*Review for Exam 3*	
Nov 21	**Exam 3**	
Nov 23-25	**Thanksgiving Break**	
	Geographical ecology and patterns of biodiversity	
Nov 28	Measuring, quantifying, and assessing species diversity	Ch. 16
Nov 31	Causes of spatial and temporal patterns in biodiversity	Ch. 22
Dec 2	The Equilibrium Theory of Island Biogeography	
	Landscape Ecology, metapopulation biology, and conservation	Ch. 21
Dec 5	Landscape ecology & metapopulation biology	
Dec 7	Landscape ecology and the design of nature reserves	
Dec 9	Factors responsible for population declines and extinctions	
Dec 15	**Comprehensive Final Exam 9-11 AM**	

Grading Criteria	**Points**	**Approximate grade distribution**
In class lecture exams -- 100 points each, 3 exams	300	90-100% (537-600 points) ≈ A
Take-home essay questions	50	80-89% (477-536 points) ≈ B
Final exam	150	70-79% (417-476 points) ≈ C
Research project & paper	100	60-69% (357-416 points) ≈ D
		< 60% (0-356 points) ≈ F
Total Points	600	

Exams: Exams will consist of a mix of multiple-choice questions, short answers, matching, definitions, true or false questions, and one or more short essay questions. The essay questions will be designed to test your ability to creatively

apply the concepts you have learned to interpret information and solve problems. In addition, there will be at least two take-home essays/assignments dealing with material that is too in depth to be covered in the in class exams. Use of notes and articles will be allowed on the take-home essays/assignments. Exams 1-3 will be worth 100 points each. The final exam will be comprehensive, but there will be an emphasis on material covered since Exam 3. It will be worth 150 points.

Research Project: You will be required to complete a research project and write a paper about your project. Your project should involve a simple experiment or series of field observations designed to test a specific hypothesis. The data that you collect must be analyzed in a quantitative manner. This means that you should plan your study carefully and pay close attention to the importance controls, replication of experimental units (or sampling units), etc. The format of your paper should follow the general format of journal articles (There should be Introduction, Materials and Methods, Results, Discussion, and Literature Cited sections, etc., see Pechenik's "A short guiding to writing about biology"). Examples of specific projects and details on the format of the paper will be provided in class. This assignment is due by December 7 (Pearl Harbor Day).

BIOL 3035 – General Ecology Lab – Tentative Schedule

Date

Monday	**Friday**	**Activity**
Aug 29	Sept 9	Lab 1 – Experimental ecology & hypothesis testing (Lab room)
Sept 12	Sept 16	Lab 2 – Biomes and climate diagrams (Field trip)
Sept 19	Sept 23	Lab 3 – Ecosystem ecology: a look at a stream ecosystem (Field trip)
Sept 26	Sept 30	Lab 4(A) – Methods for estimating animal population density I (Field trip)
Oct 3	Oct 7	Lab 4(B) – Methods for estimating animal population density II (Field trip)
Oct 10	Oct 14	Lab 5(A) – Life tables (Meet at the cemetery next to Iron Mission S.P.)
Oct 17	Oct 21	Lab 5(B) – Analyzing demographic data & population dynamics (Lab room)
Oct 31	Oct 28	Lab 6 – Spatial pattern analysis & size-abundance comparisons (Local field trip)
Nov 7	Nov 4	Lab 7 – The community concept & species associations (Local field trip)
Nov 14	Nov 11	Lab 8 – Predation, functional response curves, and optimal foraging (Lab room)
Nov 21	Nov 18	Lab 9 – Effects of disturbance on plant species diversity (Field trip)
Nov 28	Dec 2	Lab 10(A) – Geographical ecology (Field trip)
Dec 5	Dec 9	Lab 10(B) – Data analysis (Lab room & computer lab)

Field trips: There will be eight field trips that take place during normal lab hours. We will meet in the parking lot across the street from the motor pool (200 S) on days when field trips are scheduled.

Lab assignments: Lab handouts that include relevant background information, detailed instructions, and data sheets will be available on WebCT and on the G-drive (under the folder Classes\Grover\Ecology\Labs) before each lab. You are responsible for accessing the lab handouts and bringing copies of lab instructions and data sheets to each lab. Lab assignments (data & write-ups) will be due one week after the completion of the corresponding lab activity, but may be turned in earlier if desired. Late assignments will receive a five points per week deduction (1 point per day, M-F), and will not be accepted under any circumstances if they are more than two weeks late. Assignments will be worth 20-40 points each, depending on their duration and difficulty. There will be 300 points possible. Your lowest lab score or a single missed lab will be dropped and not considered in your grade. However, you are encouraged to complete all labs, and a five-point bonus will be awarded to everyone who attends all lab activities and completes all labs by the due dates. The last lab will be completed during the lab period.

Labs are designed to complement lecture topics. Consequently, I recommend reading all lab material before labs and when studying for lecture exams.

Academic integrity: Plagiarism will not be tolerated in any form. Consult the current issue of the student handbook (published by Student Services) regarding expectations for students and the intellectual property policy.

Services for Students with Disabilities: Students with medical, psychological, learning or other disabilities desiring academic adjustments, accommodations, or auxiliary aids must contact the Disability Support Center, Room 205D, Sharwan Smith Center, phone (435) 865-8022. The Disability Support Center determines eligibility for and authorizes the provision of these services and aids.