

ECOLOGY (BIOL 3300) -- Fall Semester 2008

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 Biol. Dept. -5759

Office Hours: TR 9:20-10:15; other times by appointment.

Text: Smith, R.L., and T.M. Smith. 2001. Ecology and field biology. 6th ed.
 Benjamin Cummings, San Francisco, CA. 771 pp.

**STUDENTS ARE RESPONSIBLE ON EXAMS FOR ALL ASSIGNED READINGS.

Lecture: ca. 65% of grade from 3 100-pt. lecture exams.

*EXAM DATES: 1) Thurs., Sep. 18; 2) Thurs., Oct. 30; 3) Wed., Dec. 10, 10:15-12:15 am.

Lab = ca. 35% of course grade, from writeups of field/laboratory exercises; including original investigations and computer simulations.

LECTURE SCHEDULE

Week #	Topic	Chapters in Smith & Smith
1	Introduction to Ecology Definitions; History and Development of Ecology; Examples of Interconnectedness (food webs, applied ecology).	1
1/2	Population Genetics, Natural Selection and Evolution Nature of Genetic Variation; Microevolutionary Mechanisms (incl. Drift, Gene Flow); Adaptation; Ecotypes; Darwinian and Neo-Darwinian Paradigms; Selection Models; S. Wright's Shifting Balance; Speciation Models; Macroevolutionary Patterns and Paleocology; Punctuated Equilibrium.	19
3-5	Physical and Physiological Ecology Conditions and Resources Law of Tolerance; Acclimatization v. Regulation; Temporal and Spatial Heterogeneity; Global Climate, Biomes and Ecotones; Tilman's classification of resources; Organisms as Resources; N/P/H ₂ O cycles, Eutrophication; Light as a Resource and Condition.	5 Skim 7,8 2,27 6 Skim 24,25,26 pp. 253-62;
EXAM 1	Soils and Site Factors; ESS Models; Niche Theories.	383-83
6/7	Population Ecology: Demography, Dynamics, & Density-dependence Dispersion and the Poisson; Life Tables, Mortality and Survivorship Curves; Fecundity Schedules; Crude v. Ecological Density; Unitary v. Modular Organisms; Growth Models (discrete and continuous); Reproductive Potential (r), Carrying Capacity (K); Intraspecific Competition (Contest v. Scramble, k-values, Exploitative v. Interference); Yield Curve; Pop'n. Regulation (Territoriality, Self-thinning).	10, 11, 12 pp. 336-42
8	Reproductive Ecology & Life Histories Selection Components; Modes of Semelparity and Iteroparity; Life-History Tradeoffs; Bet-hedging; r- v. K- Strategists; Allometry; Reproductive Value; Mating Systems; Parental Care; Kin Selection.	13

9/10	Interspecific Competition	14
EXAM 2	Modes (Schoener); Classic Field/Lab Studies; Lotka-Volterra Equations and Isoclines; Interactions (Keystone Pred., D/I factors, Parasitism); Community Assembly Rules (Ecological Fitting, Realized Niche); Character Displacement; A New Paradigm?	
11/12	Foraging Ecology, Predator-Prey Interactions, Parasitism and Mutualism	15,16,17
	Optimal Foraging Models and Niche Breadth; "Hunters v. Croppers"; Habitat Selection; Functional Response and Switching; Lotka Volterra Model and Pred/Prey Cycles; Paradox of Enrichment; Coevolution (Host/Parasite: Intrademic Group Selection).	
13	Ecosystem Structure and Function	24
	Primary and Secondary Productivity; Standing Crop and Turnover Rate; Trophic Pyramid (Inverted Marine); Food Webs; HSS Hypothesis and Evidence.	
14	Community Structure & Dynamics, Stability, Diversity, & Complexity	20
	Community Unit v. Continuum Models; Classification and Ordination; Species Diversity (alpha, beta; edge effect; Hypotheses of factors affecting; latitudinal clines); Food Web Connectance.	
15	Ecosystem Development, Island/Landscape Ecology, Conservation Biology and Preservation of Biodiversity	21,22,23
EXAM 3	Primary and Secondary Succession; Facilitation and Inhibition; Retrogression and Ecosystem Management; Species-Area Effect; MacArthur-Wilson Equilibrium Theory; Taxon Cycle; Vicariance Biogeography; Habitat Fragmentation (Interior/Edge); Corridors and Interchange; Biodiversity in Tropics: Current Status.	

Tentative Laboratory/Field Schedule Assignment (pts.)

Week 1 --	Intro to Inland Coastal Plain Ecosystems.	Hypotheses (10)
	(**READ pp. 12-17; Skim Ch. 28-31 + Appendix A for ideas**)	
2 --	Population Genetics Computer Simulations	Assignment (15)
3/4 --	Eco-physiology Experiment	Scientific Paper (25)
5/6 --	Habitat Assessments	Scientific Paper (35)
7 --	Field or Lab Exercise (TBA)	
FIELDTRIP TO SAPELO ISLAND (Fri-Sun, choose Oct. 17-19 or Oct. 24-26)		
9 --	Human Demography	Life Table (15)
10 --	Computer Simulations	Assignment (5)
11 --	Mark-Recapture and Pop. Estimation Simulation	Report (25)
12-15 --	Community and/or Behavioral Ecology Field Experiment (TBA)	Scientific Paper (45)

Ecology (BIOL 3300) -- Fall 2008 Expectations of Students

1. The text is written at an introductory level--it will serve as your introduction and background to the lecture topics. Therefore, read it carefully, preferably before the lecture; otherwise, you may find that you are lost! Success in this course demands that you attend every day and come to class prepared.
2. On weeks that I inform you we will be in the field, be prepared to leave for the field promptly at lab time--this includes APPROPRIATE ATTIRE. We will be encountering briars, chiggers, fire ants, ticks, mosquitoes, and possibly snakes; you are responsible for your own protection against these as well as the climatic elements (I can't control either). You may not make up missed labs; I will deduct points from your grade for any lab absences beyond one.
3. An important part of this course is the writing of laboratory reports and scientific papers. We will be collecting data in the field and lab as a group. In some cases, we will analyze these data as a group. You will be receiving written and verbal instructions as to how to prepare a scientific paper later in the semester. I expect you to share the basic data and results of certain analyses. I expect each and every person to do his or her own writing, however. Copying of phrases or sentences from references without quotation marks and proper citation or even slightly modified phrases and sentences "borrowed" from these sources constitutes plagiarism and will not be tolerated in this course.

Borrowing of sentences or paragraphs from previously written papers or others' papers is also plagiarism. I keep a file of the best papers from previous classes. I will also use electronic means of detecting plagiarism. Any attempt at plagiarism on any paper will earn the student a grade of zero. Repeat violations may warrant additional penalties or disciplinary action, as described on the VSU Biology Department Home Page¹.

Despite the above admonition, a few students in past years have been foolish enough to "test" the system by passing off papers that contained portions plagiarized from earlier papers and from the Web. REMEMBER: (1) I KEEP COPIES OF EARLIER STUDENT PAPERS AND OF IMPORTANT PRIMARY REFERENCES; (2) I CONDUCT WEB SEARCHES OF ANY AND ALL SUSPECT PASSAGES.

4. Each student is responsible for making up any material missed due to absence, regardless of reason. Attitude, attendance, cooperation, etc. are appropriate criteria for me to consider when assigning a final grade when the student's grade is "borderline." Excessive absences, conveyance of negative attitudes, lack of attentiveness or cooperation will not incline me toward giving you that extra "benefit of the doubt" in such decisions.

Ecological fieldwork can be fun and rewarding, but at times it can be hard work under rigorous conditions. If you are not used to either of the latter two, be prepared for a learning experience that may enrich your life in ways you'll only begin to appreciate now. And since we'll all be doing this together, adopting a positive attitude from the start will improve the already likely prospects of this being a positive experience for everyone.

¹<http://www.valdosta.edu/biology/>

BIOL 3300 Expectations (cont'd.)

5. If you should have any kind of question, problem, comment, complaint, crisis, etc., involving this course, I'm the appropriate person for you to talk to. Please come by and see me about it immediately; that's what I'm here for. Feel free to stop by anytime (but try office hours first).
6. **STUDENTS WITH DISABILITIES:** Students requiring classroom or testing accommodations because of documented disabilities should discuss their needs with the instructor at the beginning of the quarter. To register with the Access Office, go to 1115 Nevins or call 245-2498 (voice) or 219-1348 (tty).

COURSE GOALS AND LEARNING OUTCOMES:

This course is designed to give the Biology Major a basic understanding of the modern theories and principles of the several subfields of ecology, which is the study of the individual organism in the context of its physical and biotic environment, as well as the study of populations, communities and ecosystems in their respective environments and interactions among these. We will also explore human influences on these ecological systems and processes. The laboratory experience will be largely field-based and will give the student a familiarity with several of the predominant ecosystems of the coastal plain of the southeastern United States. During field (and laboratory) exercises, students will put to practice scientific methodology in posing hypotheses, designing experiments and collecting and analyzing data, and finally conveying the results of those investigations in scientifically written reports.

With reference to the Educational Outcomes for the B.S. Degree in Biology (see p. 108 of 2008-2009 VSU Undergraduate Catalog) and as explained above, BIOL 3300 is particularly designed to give the student extensive background in Outcomes #1 and #5.

With reference to the VSU General Education Outcomes¹, BIOL 3300 will significantly address the following: #3) Students will use computer and information technology when appropriate; #4) Students will express themselves clearly, logically, and precisely in writing and in speaking, and they will demonstrate competence in reading and listening; #5) Students will demonstrate knowledge of scientific and mathematical principles and proficiency in laboratory practices; #7) Students will demonstrate the ability to analyze, to evaluate, and to make inferences from oral, written, and visual materials.

¹<http://www.valdosta.edu/academic/VSUGeneralEducationOutcomes.shtml>