

## Biology 116, Ecology and Evolution Spring 2006

**Time and Location:** BioSci 111, Tuesday & Thursday, 8:30-9:45

**Professors:** Dr. Emily Bernhardt, B234 LSRC, [ebernar@duke.edu](mailto:ebernar@duke.edu)  
Dr. John Willis, 072-A Bio Sci Building, [jwillis@duke.edu](mailto:jwillis@duke.edu)

**Teaching Assistants:** Ed Venit, 0071 Bio Sci Building, [epv@duke.edu](mailto:epv@duke.edu)  
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**Texts for Lecture:** readings for ecology will be posted as pdfs on Blackboard  
readings for evolution will be from *Evolution* textbook by Douglas J. Futuyma

### Lecture Schedule

Week 1:	January 12	Introduction to Ecology & Evolution	Bernhardt/Willis
Week 2:	January 17	Individual/Physiological Ecology	Bernhardt
	January 19	Organism Stoichiometry, from Genes to Ecosystems	Bernhardt
Week 3:	January 24	Population Ecology, growth and regulation	Bernhardt
	January 26	Population Ecology, Life history	Bernhardt
Week 4:	January 31	Evidence for Evolution, Natural Selection	Willis
	February 2	Genetic Variation in Mendelian Populations	Willis
Week 5:	February 7	Natural Selection	Willis
	February 9	Mutation and Natural Selection	Willis
Week 6:	February 14	<b>EXAM I</b>	
	February 16	Natural Selection and the Maintenance of Variation	Willis
Week 7:	February 21	Random Genetic Drift	Willis
	February 23	Evolution in Subdivided Populations	Willis
Week 8:	February 28	Molecular Evolution	Willis
	March 2	Genome Evolution	Willis
Week 9:	March 7	Evolution of Complex Genetic Traits & Sexual Selection	Willis
	March 9	Altruism, Kin Selection, & the Evolution of Social Behavior	Willis
Week 10:	March 14	<b>Spring Break</b>	
	March 16	<b>Spring Break</b>	
Week 11:	March 21	Evolution of Reproductive Isolating Barriers	Willis

	March 23	Genetics and the Patterns of Speciation	Willis
Week 12	March 28 March 30	<b>EXAM II</b> Community Ecology: Competition	Bernhardt
Week 13:	April 4 April 6	Community Ecology: Trophic Dynamics Of pathogens and hosts: disease and parasitism	Bernhardt Bernhardt
Week 14:	April 11 April 13	Mutualists, Engineers and Facilitators Succession and Ecosystem Development	Bernhardt Bernhardt
Week 15:	April 18 April 20	Fueling ecosystems: nutrient and energy cycling Alternate steady states: why this and not that?	Bernhardt Bernhardt
Week 16:	April 25	What is global change?	Bernhardt
Week 17:	May 4	<b>Final Exam, cumulative</b> (2:00 – 5:00 pm, 111 Bio Sci Building)	

## Evaluation Policy

**Exam Grade (65% of total grade):** Three exams will be given in the lecture portion of the course. Two midterms will be given during the term (February 17 and April 1). There will also be one cumulative final exam during finals week. Your grade for the lecture portion of the class will be calculated in two ways: (1) a weighted average of all three exams, with the final counting twice as much as the midterms, and (2) your score on the final exam alone. Only the higher of those two calculated grades will be used as your grade for the exam portion of the grade.

**Problem Set Grade (25% of total grade):** There will be five graded problem sets assigned during this quarter. Problem sets will be handed out in discussion sections, and will be due in discussion section the following week. Each problem set will be graded on a five-point scale, with one point taken off for each day that the problem set is late!

**Quiz Grade (5% of total grade):** From time to time there will be brief pop quizzes during normal lecture period. These scores will be averaged, and the average score will contribute to 5% of the final grade. Quizzes missed because of unexcused absences will not be able to be made up.

**Discussion Participation Grade (5% of total grade):** You are expected to be prepared for the discussion sections, and to participate fully in them. Don't be afraid to join in!

**Determination of Class Grade:** Numeric grades from all three sources will be combined according to the distribution system outlined above. Letter grades will then be determined according to the distribution of grades in the class (generally speaking, the mean score is taken to be equal to about a C plus or B minus).

## Lecture Reading Assignments

- January 12 Futuyma, Chapter 1  
Chapter 16 “Lonely Planet” from Bill Bryson's A Brief History of Nearly Everything -- pdf posted
- January 17 Recommended background reading. M. Begon, C.R. Townsend, and J.L. Harper. 2006. Conditions Ch. 2 Ecology: From Individuals to Ecosystems 4<sup>th</sup> ed. Blackwell, Oxford, UK. pdf posted
- January 19 Elser, J. J., R. W. Sterner, E. Gorokhova, W. F. Fagan, T. A. Markow, J. B. Cotner, J. F. Harrison, S. E. Hobbie, G. M. Odell, and L. J. Weider. 2000. Biological stoichiometry from genes to ecosystems. Ecology Letters 3: 540-550. -pdf posted
- January 24 Chapter 7 “**POPULATION DISTRIBUTION AND ABUNDANCE**” from Cain et al. Ecology text – pdf posted
- January 26 Chapter 8 “**POPULATION GROWTH AND REGULATION**” from Cain et al. Ecology text – pdf posted  
Chapter 9 “**POPULATION DYNAMICS**” from Cain et al. Ecology text – pdf posted
- January 31 Futuyma, Chapters 2-6 for overview/background
- February 2 Futuyma, Chapters 8-9
- February 7 Futuyma, Chapters 11-12
- February 9 Futuyma, Chapters 11-12
- February 16 Futuyma, Chapters 11-12
- February 21 Futuyma, Chapter 10
- February 23 Futuyma, Chapter 10
- February 28 Futuyma, Chapter 19
- March 2 Futuyma, Chapter 19
- March 7 Futuyma, Chapter 13-14
- March 9 Futuyma, Chapter 14

- March 21 Futuyma, Chapter 15-16
- March 23 Futuyma, Chapter 15-16
- March 30 Chapter 10 “**COMPETITION**” from Cain et al. Ecology text – pdf posted
- April 4 Carpenter, S. R., James F. Kitchell, and James R. Hodgson. 1985. Cascading trophic interactions and lake productivity. Bioscience 35: 634-639.
- Chapter 11 “**PREDATION AND HERBIVORY**” from Cain et al. Ecology text – pdf posted
- April 6 Patz, J.A. et al. 2005. Climate change and human health. Nature 438: 310-317
- Chapter 12 “**PARASITISM AND DISEASE**” from Cain et al. Ecology text – pdf posted
- April 11 Chapter 13 “**MUTUALISM AND COMMENSALISM**” from Cain et al. Ecology text – pdf posted
- April 13 E.P. Odum. 1969. The Strategy of Ecosystem Development. Science 126: 262-270
- Chadwick, O.A., L.A. Derry, P.M. Vitousek, B.J. Huebert, and L.O. Hedin. 1999. Changing sources of nutrients during four million years of ecosystem development. Nature 397: 491-497
- April 18 Helfield, J. M., and R. J. Naiman. 2001. Effects of salmon-derived nitrogen on riparian forest growth and implications for stream productivity. Ecology 82: 2403-2409.
- Chapter 20 “**Nutrient Supply and Cycling**” from Cain et al. Ecology text – pdf posted
- April 20 Croll DA, J.L. Maron, J.A. Estes, et al. Introduced predators transform subarctic islands from grassland to tundra Science 307: 1959-1961
- April 25 Vitousek, P.M. et. al. 1997. Human domination of Earth's ecosystems. Science 277: 494-499.
- Vorosmarty, C. J., P. Green, J. Salisbury, and R. B. Lammers. 2000. Global water resources: Vulnerability from climate change acid population growth. Science 289: 284-288.