Tentative Syllabus: "Ecological and Evolutionary Physiology" (BIOL 174) Winter 2008

Professor: Dr. Theodore Garland, Jr., Professor of Biology, University of California, Riverside.  
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Office Hours: Tuesday and Wednesday, 10-11 A.M. in 109 ULB, or by appointment.

Teaching Assistant: Mr. Thomas H. Meek, Ph.D. student, Dept. of Biology, UCR  
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Catalog Description: Interactions between organisms and their environments, emphasizing  
coadaptation of physiological, morphological, and behavioral phenotypes. Topics include:  
allometry and scaling, metabolism and locomotion, heat and water exchange, evolution of  
endothermy, artificial selection experiments, and phylogenetically based statistical methods.

Lecture: Tuesday and Thursday, 8:10 - 9:30 A.M. in 1471 BOYHL (Boyce Hall)

Required Readings: All readings as PDF files will be posted online at http://ilearn.ucr.edu/.  
These should be read before class. Lectures will be posted only after class.

Grading: Mid-term Exam 1 (50 points), Mid-term Exam 2 (50 points), Final Exam (50 points),  
Discussion Section (50 points). Total = 200 points.

Lecture Schedule and Required Readings for both Lecture and Discussion:

1. 8 Jan. 2008 - Introduction to Course; Historical Development of Eco/Evo Physiology  
No assigned reading.

9 Jan. 2008 Discussion Reading:  
Ecological Society of America 63:340-347. Definitions and Opinions by: G. A. Bartholomew,  
A. Bennett, W. D. Billings, B. F. Chabot, D. M. Gates, B. Heinrich, R. B. Huey, D. H. Janzen,  

2. 10 Jan. 2008 - continue from previous lecture  
Cambridge University Press.


3. 15 Jan. 2008 - Evolution and the Phenotypic Hierarchy  
University Press.
16 Jan. 2008 Discussion Reading:

4. 17 Jan. 2008 - Allometry and Scaling

5. 22 Jan. 2008 - finish Allometry; Statistical Tutorial; Thermoregulation & Resting Metabol.

23 Jan. 2008 Discussion Reading (and Quiz #1):


7. 29 Jan. 2008 - Mid-term Exam 1

30 Jan. 2008 Discussion Reading:

8. 31 Jan. 2008 - finish Locomotor Performance and Energetics; Evolution of Endothermy


6 Feb. 2008 Discussion Reading:
10. 7 Feb. 2008 - Evolution of Endothermy

11. 12 Feb. 2008 - Optimality Models and Symmorphosis
Gans, C. 1979. Momentarily excessive construction as the basis for protoadaptation. Evolution
33:227-233.

13 Feb. 2008 Discussion Reading:
Allen, A. P., and J. F. Gillooly. 2007. The mechanistic basis of the metabolic theory of

12. 14 Feb. 2008 - Individual Variation
basis of aerobic performance variation in red jungle fowl. Journal of Experimental Biology
203:2053-2064.
Harris, M. A., and K. Steudel. 2002. The relationship between maximum jumping performance and
hind limb morphology/physiology in domestic cats (Felis silvestris catus). Journal of
Experimental Biology 205:3877-3889.

13. 19 Feb. 2008 - Quantitative Genetics xxneed to expand for next year

20 Feb. 2008 Discussion Reading (and Quiz #2):
Buckley, L. B. 2008. Linking traits to energetics and population dynamics to predict lizard

14. 21 Feb. 2008 - Mid-term Exam 2

15. 26 Feb. 2008 - Measuring Selection in the Wild
Miles, D.B. 2004. The race goes to the swift: fitness consequences of variation in sprint performance
Sinervo, B., D. B. Miles, W. A. Frankino, M. Klukowski, and D. F. DeNardo. 2000. Testosterone,
endurance, and Darwinian fitness: Natural and sexual selection on the physiological bases of

27 Feb. 2008 Discussion Reading (Paper Critique #1 due at start):
mediated trade-off between mating effort and parental effort. American Naturalist 170:864-
875.

16. 28 Feb. 2008 - Studying Microevolution in the Wild: Guest lecturer Prof. M. A. Chappell
alpha-chain hemoglobin polymorphisms. Proceedings National Academy of Sciences, USA
17. **4 March 2008 - Phenotypic Plasticity**
Pigliucci, M. Phenotypic plasticity 101. From http://www.genotypebyenvironment.org/

**5 March 2008 Discussion Reading:**

18. **6 March 2008 - Selection Experiments & Experimental Evolution 1**

19. **11 March 2008 - Selection Experiments & Experimental Evolution 2**

**12 March 2008 Discussion Reading (Paper Critique #2 due at start):**

20. **13 March 2008 - Interspecific Comparisons and Why Phylogeny Matters**

**21 March 2008 - Final Exam 3:00 - 6:00 P.M. (emphasizes last third of course)**