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### BIOL 446.01: Wildlife Physiological Ecology

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BIOL 446, Sec 01, 3 credits, Wildlife Physiological Ecology  
BIOL 530, Sec 01, 1 credit, Advanced Topics in Physiology - Energetics and Nutritional Ecology

Chris Guglielmo

BIOL 446 - Wildlife Physiological Ecology, MWF 11:10-12:00

Physiology can be thought of as the study of the organism as machine - its workings and control systems. This course will explore the physiology of wild vertebrates (birds, mammals, reptiles, amphibians and fish). It is designed to give students a comprehensive understanding of the how biotic and abiotic factors in the environment influence animal physiology, and how physiological characteristics of animals influence their behavior and ecology. I will emphasis (and demystify) techniques used to study physiological ecology in the field and laboratory. A major objective is to give the wildlife ecologist an understanding of how physiological studies can aid in conservation and management activities, for example by providing information on animal health or physiological performance. General areas covered will include energetics, thermal biology, nutritional ecology, reproductive physiology, plant-herbivore interactions, osmoregulation, endocrinology and ecotoxicology.

BIOL 530 - Advanced Topics in Physiology.  
Semester Topic - Animal Energetics and Nutritional Ecology  
Day and Time to be decided at first meeting on Monday Jan 27, 4pm  
room HS108.

This course will be held in a seminar format and will meet once per week. Previous knowledge of physiological ecology or energetics is not required as the needed basics will be introduced in initial lectures. We will use the primary scientific literature to explore current issues in animal energy and nutrient utilization.

**BIOL 446 – Wildlife Physiological Ecology – Spring Semester 2003**  
**Lecture: 11:10 – 12:00 MWF; SC 423**

<u>DATE</u>	<u>LECT#</u>	<u>TOPIC</u>	<u>READING, M=McNab, E=Eckert</u>
M 1/27	1	Introduction, Course Policies, Homeostasis	E pp8-11, 85-86
W 1/29	2	Nervous and Endocrine Regulation (1)	E pp310-319, 333-348
F 1/31	3	Nervous and Endocrine Regulation (2)	E pp284, 294-298
M 2/3	*	<b>Discussion</b> - Scaling, Evolutionary Concepts	M ch 1, ERES, Handout
W 2/5	4	Metabolism – Biochemical Aspects	M ch 9, E pp59, 72-76
F 2/7	5	Metabolism, Metabolic Rate	M ch 3, 10; E pp667-680
M 2/10	6	Metabolic Rate, Ecology and Phylogeny <b>PROBLEM SET 1 DUE</b>	M ch 3, 10; E pp667-680
W 2/12	7	Activity Energetics (1)	M ch 9
F 2/14	8	Freezing Avoidance and Tolerance <b>Guest Lecture</b>	M ch 4.7
M 2/17	-	<b>HOLIDAY (PRESIDENTS DAY)</b>	
W 2/19	9	Activity Energetics (2)	M ch 9
F 2/21	10	Thermal Exchange, Physical Aspects	M ch 2.5, ch 9.3
M 2/24	11	Thermoregulation, Ectotherms	M ch 4
W 2/26	12	Thermoregulation, Ectotherms, Endotherms <b>PROBLEM SET 2 DUE</b>	M ch 4, ch 5
F 2/28	--	<b>FIRST HOUR EXAM (LECTURES 1/27 – 2/24 INCLUSIVE)</b>	
M 3/3	13	Thermoregulation, Endotherms	M ch 5
W 3/5	14	Torpor	M ch 11
F 3/7	15	Coping with Heat Loads	M ch 7, E pp722-725
M 3/10	*	<b>Discussion</b> - Hibernation	ERES
W 3/12	16	Osmotic Exchange in Aquatic Vertebrates	M ch 6, E pp579-582, 588-590, 618-621
F 3/14	17	Water and Salt Balance, Terrestrial (1) <b>PROBLEM SET 3 DUE</b>	M 6.10, E pp583-587, 590-592, 610-613, 615-617

M 3/17	18	Water and Salt Balance, Terrestrial (2)	
W 3/19	19	Principles of Gas Exchange and Transport	M ch 2.11, ch 8
F 3/21	*	<b>Discussion</b> - Diving	ERES
M 3/24 – 3/28	--	<b>HOLIDAY (SPRING BREAK)</b>	
M 3/31	20	Hypoxia and High Altitude	M ch 8
W 4/2	21	Digestion, Biochemical Aspects (1)	E pp637-661
F 4/4	22	Digestion, Biochemical Aspects (2) <b>RESEARCH PROPOSAL DUE</b>	
M 4/7	23	Digestive Efficiency	M ch 12.1- 12.5
W 4/9	24	Digestive Adaptations to Plant Cell Walls (1)	M ch 12.6 – 12.7.2
F 4/11	--	<b>SECOND HOUR EXAM (LECTURES 2/26 – 4/4 INCLUSIVE)</b>	
M 4/14	25	Digestive Adaptations to Plant Cell Walls (2)	
W 4/16	26	Plant Secondary Metabolites, Detoxification	M ch 12.8 – 12.9.3
F 4/18	27	Nutrient Requirements	
M 4/21	*	<b>Discussion</b> – Stable Isotopes <b>PROBLEM SET 4 DUE</b>	ERES
W 4/23	28	Periodicity, Biological Clocks	M ch 11.1 – 11.4, E pp688-690
F 4/25	29	Production and Storage (1)	M ch 10.7, 11.4
M 4/28	30	Production and Storage (2)	
W 4/30	31	Reproduction, Mammals	M 10.6
F 5/2	32	Reproduction, Birds / Ectotherms	
M 5/5	33	Physiology of Eggs	
W 5/7	34	Assessment of Body Condition	
F 5/9	35	Blood and Urine Indicators of Health and Condition	
M 5/12	--	<b>FINAL EXAM 10:10 – 12:10, SC 423</b>	