6 Jan 2015

BIOL 4803A: Biology of Terrestrial Vertebrates
Spring 2015

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MW 2:05–2:55 pm (CE 322), F 2:05-4:55 pm (Zoo Atlanta or CULC 487), 3 credits
Office Hours: W 3:15–4:15 CULC 474C

Course Overview and Objectives: This course focuses on the natural history of terrestrial vertebrates: their classification, evolution, anatomy, physiology, behavior, and conservation. Our focus will be on extant organisms. The laboratory portion of the course will emphasize behavioral biology of the animal collection housed at Zoo Atlanta, with additional several field trips. You will also develop and carry out a short behavioral research project at the Zoo. Prerequisite coursework: BIOL 1520 and 2335 (required), BIOL 3600 (recommended).
By the end of this course, students will be able to:

- explain phylogenetic relationships among vertebrates, and describe evolutionary history of vertebrates as inferred from phylogenetic analyses
- analyze the structure & function of key characteristics of each vertebrate class, and explain examples of adaptation and constraint
- use scientific knowledge to interpret examples and case studies involving contemporary issues affecting vertebrates, including the impact of humans on vertebrate biodiversity
- communicate knowledge of vertebrates to diverse audiences in a variety of formats

Required Materials: *Shubin, Neil. 2009. Your Inner Fish. Vintage Press.*
Readings from primary literature will be provided on T-square. As part of your research project you will need a bound lab notebook. Because this course involves research with vertebrates, there are several federal and university requirements that must be met. Every student is required to complete the following:

1). Complete the CITI training modules (at https://www.citiprogram.org/default.asp?language=english) "Working with the IACUC" and "Working with Amphibians" and "Working with Non-human Primates". These must be complete prior to Wednesday, January 11.

2) Enroll in Occupational Health Program at GT (form provided on first day of class). This is a medical surveillance program that provides recommendations for health-related precautions that you may need to take for this course. It is informational and you can opt-out of any suggested measures that are provided.

Course Format: Class meetings on Mondays and Wednesdays will be devoted to traditional lectures and active discussion; your preparation and willing participation are a key component of a productive and fun environment. On Fridays, we will meet at Zoo Atlanta for prepared exercises and several weeks devoted to independent research; we will also use lab time for discussion of assigned readings. We will be outdoors and appropriate clothing for the elements is expected at all times! Transportation from GT to the Zoo is available; if you choose to travel independently we encourage you to arrange car pools. The final exam will test your ability to think synthetically about the semester's concepts, and will **not** be a set of cumulative questions recapitulating the detail of the semester.

Grading: Your grade will be assessed out of 450 pts using the following scale:
A = 100-89.5% B = 89.4-79.5% C = 79.4-69.5% D = 69.4-59.5% F = 59.4-0%

Assignment	Points
4 unit quizzes (50 pt ea)	200
1 Literature review	50
Project proposal	25 (rewrite for additional 5 pt)
Research presentation	25
Research paper	50
Final exam	50
Participation	50
Total	450

Honor Code and Code of Conduct: All students are expected to abide by the Academic Honor Code, http://www.honor.gatech.edu and Code of Conduct, http://www.deanofstudents.gatech.edu/codeofconduct. Some specific examples of Honor Code violations that we've encountered include: copying during exams, incorrect citations or lack of citations in writing, submitting another's work as your own.

Accommodations: We will make classroom accommodations for students with disabilities. These accommodations must be arranged in advance and in accordance with ADAPTS (www.adapts.gatech.edu).

Course Schedule – Please see the accompanying schedule for lecture dates and reading assignments, which will be *updated throughout the semester.*

Date	Topic	Reading	Assignments/Exams
Unit 1	**Evolutionary & Morphology**	—	—
M 5 Jan	Vertebrate phylogeny		
W 7 Jan	Aquatic–terrestrial transition		
F 9 Jan	LAB: Phylogeny & classification	Sander, 2012	Group 1
M 12 Jan	Aquatic–terrestrial transition		
W 14 Jan	Locomotor systems (Dr. Henry Astley)		
F 16 Jan	LAB: explore Zoo Atlanta	Shubin ch. 1–3	Group 2
M 19 Jan	***MLK Holiday***		
W 21 Jan	Locomotor systems		
F 23 Jan	LAB: Biomechanics of locomotion	Goldman & Hu, 2010	Group 3
M 26 Jan	Integument		
W 28 Jan	Jaw morphology & Feeding (Dr. Jenny McGuire)		
F 30 Jan	LAB: Mechanics of feeding & integument	Shubin ch. 4 Koschovitz et al., 2014 Zimmerman 2014	Group 4 *Literature Review topics due*
Unit 2	**Physiology & Sensory Systems**	—	—
M 2 Feb	Endothermy vs. ectothermy		**Quiz Unit 1**
W 4 Feb	Biomass, energy budgets & storage		
F 6 Feb	LAB: Physiological diversity at the Zoo	Pough, 1980 Burton & Likens, 1975; Semlitsch et al., 2014	
M 9 Feb	Feeding ecology & digestion		
W 11 Feb	Convergent endothermy (Dr. Al Dove)		
F 13 Feb	LAB: Body design of fishes (GA Aquarium)	Grady et al., 2014	
M 16 Feb	Water balance		
W 18 Feb	Sensory Systems		
F 20 Feb	LAB: Bird identification/Fernbank	Shubin ch. 8–10	
M 23 Feb	TBA		
Unit 3	**Reproduction**	—	—
W 25 Feb	Fertility & anatomy		**Quiz Unit 2**
F 27 Feb	LAB: Research projects—brainstorming & exp'tal design (Dr. Linda Green)		
M 2 Mar	Eggs & viviparity		
W 4 Mar	Sex determination & metamorphosis	Valenzuela, 2004 Shine, 2014	*Project proposals due*
F 6 Mar	LAB: Research data trials		
M 9 Mar	Social systems	Lukas & Huchard, 2014	

W 11 Mar	Mate choice & parental care		
F 13 Mar	LAB: Research data collection I		
M 16 Mar	*Spring Break*		
W 18 Mar	*Spring Break*		
F 20 Mar	*Spring Break*		
Unit 4	**Evolution of primates**	—	—
M 23 Mar	Anatomy & fossil history	Shubin ch. 11–epilogue	**Quiz Unit 3**
W 25 Mar	Comparative primate behavior (Dr. Tara Stoinski)	Stoinski et al., 2011	
F 27 Mar	LAB: Research data collection II		
M 30 Mar	Evolution of primate social systems		
Unit 5	**Vertebrate conservation**	—	—
W 1 Apr	Discuss research projects		**Quiz Unit 4**
F 3 Apr	LAB: Research data collection III & analyses		
M 6 Apr	Conservation biology	Mace 2014	
W 8 Apr	Conservation ethics	Minteer & Collins, 2005	
F 10 Apr	LAB: Research data analyses (@ Tech)		
M 13 Apr	Conservation: case studies	Dirzo et al., 2014	
W 15 Apr	Golden Lion Tamarin case study (Dr. Jennifer Mickelberg)		
F 17 Apr	LAB: **Research Presentations**		*Research papers due*
M 20 Apr	Conservation policy	Martel et al., 2014; Lips & Mendelson, 2014	
W 22 Apr	Conservation debate	TBA	
F 24 Apr	LAB: field trip		
W 29 Apr	**Final Exam**	11:30am–2:20pm	