**6 April 2022**

**BIOS 4813-MEN: Biology of Terrestrial Vertebrates**

**Spring 2022**

**3 Credits**

Dr. Joe Mendelson, School of Biological Sciences and Zoo Atlanta, [jmendelson3@gatech.edu](mailto:jmendelson3@gatech.edu)

Teaching Assistant: Megan Wright, mwright87@gatech.edu

Lectures: MW 12:30–1:20 pm (CULC 483)

Labs: F 12:30–3:15 pm (Zoo Atlanta or CULC 483)

Office Hours: M (in-person: CULC 483) & T (online: Zoom) 2:00–3:00; or other times, by appointment

**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 possible additional field trips. You will also develop and carry out a behavioral research project at the Zoo.

By the end of this course, students will be able to:

* explain phylogenetic relationships among vertebrates, and describe evolutionary history of vertebrates
* 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 Canvas. As part of your research project you will need a bound lab notebook.

Every student is required to complete the following:

1) Complete the GT Occupational Health Program 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 typically meet at Zoo Atlanta (unless otherwise announced) 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 recommended. We will discuss plans for transportation from GT to the Zoo.

Grading: Your grade will be assessed out of 250 pts using the following scale:

A = 100ꟷ89.5% B = 89.4ꟷ79.5% C = 79.4ꟷ69.5% D = 69.4ꟷ59.5% F = 59.4ꟷ0%

**Assignment Points**

1 quiz 50

Applied Concept group presentation 50

Research proposal 25

Research presentation 25

Research paper 50

Final exam 50

Total 250

**Quiz and Final Exam:** Short answer and short-essay format. Open-book exams; all resources allowed.

**Applied Concepts Group Presentation:** These are not to be straight-up lectures! These are to be a mixture of presentation/lecture, student activities, and organized, but open, discussions.Every student in the group will receive the same grade for the group effort (unless absent, see below) or unless their role in the effort (indicated by amount of “stage-time” actually presenting, leading, or opining) is markedly different from efforts by other members of the group. A rubric will be distributed as the students settle on their chosen/approved topics. An absence on your presentation day that was not previously discussed and approved by Instructor will result in zero points on that assignment.

**Labs:** Most labs will be at Zoo Atlanta, with a few to be held in CULC 487 (noted on syllabus). GT will provide a van for transportation to the Zoo. For days scheduled at the Zoo, the van will leave from the loading dock behind Cherry Emerson Building at 12:30pm; do not be late. We will leave Zoo at 3pm, in hopes of getting you back to Cherry Emerson by scheduled end of lab at 3:15pm. Historically in this class most students choose to drive themselves or carpool. This is fine, but please do seek carpools if you feel safe; it’s greener. I will point out our designated meeting spot in Zoo parking lot for labs. Use the parking lot at 800 Cherokee Ave SE 30315. That is a City of Atlanta pay-lot, but there is plenty of free parking in the adjacent Grant Park neighborhood; just watch for fire hydrants and driveways.

**Research Project:** Students will work in groups of 4 on an original project at the Zoo involving animal behavior using observational data. Students will collaborate to produce a single data set and will collaborate to present their results in a group Research Presentation. However, students will individually submit a Research Proposal and Research Paper. More information and rubrics to be distributed. An absence on your presentation day that was not previously discussed and approved by Instructor will result in zero points on that assignment.

**COVID contingency:** As the semester is beginning, we find ourselves in a bad situation with regards to the ongoing pandemic. GT has not formally declared this course as virtual or hybrid. As such, unless Instructor Mendelson is forced to isolate, all classes will be held in person and students are expected to closely follow the GT guidelines on masking and distancing. Nonetheless, we can fully anticipate that many of us will be forced to isolate at some point during the semester. We will not be recording lectures, but we will employ a hybrid streaming (e.g., Teams) for people who need to isolate, etc. ***As soon as you know that you will not be able to attend a particular class-session in-person, contact both* *Instructor and TA via email;*** then you will be added to the Teams link for that lecture. We understand that you may not get much notice, so just make sure we know your status before lecture begins.

**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**: Please contact the instructors during the first week of class or as soon as possible if you need classroom accommodations. Accommodations should be arranged in advance and in accordance with the Office of Disability Services (<http://disabilityservices.gatech.edu/>)

**Inclusivity & Diversity:** In an ideal world, science would be objective. However, much of science—and, especially, conservation—is subjective and is historically built on a small subset of privileged voices. In this class, we will make an effort to read papers from a diverse group of scientists and stakeholders, but limits still exist on this diversity. I acknowledge that it is possible that there may be both overt and covert biases in the materials due to the lens with which they were written. Integrating a diverse set of experiences and acknowledging contrasting value systems and differing cultural norms is important for a more comprehensive understanding of science, and again especially of conservation. Please contact me (in person or electronically) with concerns, or to bring suggestions to improve the quality of the course materials. Furthermore, I strive to create a learning environment for students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.).

To help accomplish this:

* If you have a name and/or set of pronouns that differ from those that appear in your official records, please let me know.
* If you feel like your performance in the class is being impacted by your experiences outside of class, please don’t hesitate to come and talk with me. If you prefer to speak with someone outside of the course, your academic dean or the Office of Student Affairs are excellent resources.
* We are all on the continuum of learning about diverse perspectives and identities. If a particular topic or something was said in class (by anyone) makes you feel uncomfortable, please talk to me about it.
* Much of conservation action, policies, and rhetoric is based on opinions. This applies to basic science as well, in many cases. In our course, all opinions are valid and students will be challenged to deeply consider the opinions and values of a diversity of stakeholders.
* As a participant in course discussions, you should strive to honor the diversity of your classmates.

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

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| **Date** | **Topic** | **Reading** | **Assignments/Exams/Notes** |
| **Unit 1** | **Evolution & Morphology** | **—** | **—** |
| M 10 Jan | Introductions |  | CULC 483 |
| W 12 Jan | Vertebrate phylogeny |  | CULC 483 |
| F 14 Jan | **LAB 1:** Phylogeny & classification |  | At Tech: CULC 483; OHS forms due in class |
| M 17 Jan | *No Class – MLK Holiday* |  |  |
| W 19 Jan | Aquatic–terrestrial transition I & II |  |  |
| F 21 Jan | **LAB 2:** Mechanics of feeding & locomotion |  | At Zoo Atlanta |
| M 24 Jan | Feeding & Locomotion | Shubin ch. 1–3 | **Group 1** |
| W 26 Jan | Locomotion |  |  |
| F 28 Jan | **LAB 3:** Locomotion at Zoo | Shubin ch. 4–7 | Zoo Atlanta  **Group 2** |
| M 31 Jan | Elephant biomechanics (Andrew Schulz) |  | *Mendelson out* |
| W 2 Feb | Conservation Technology (Andrew Schulz) |  | *Mendelson out* |
| F 4 Feb | **LAB 4:** Special Topics working groups |  | Groups meet on their own. *Mendelson out* |
| M 7 Feb | Biology of dinosaurs |  | **Quiz Unit 1 – take home** |
| **Unit 2** | **Physiology & Sensory Systems** | **—** | **—** |
| W 9 Feb | Endothermy vs. ectothermy |  |  |
| F 11 Feb | **LAB 5:** Special Topics presentations |  | At Tech: CULC 483;**Groups 1–4** |
| M 14 Feb | Biomass, energy budgets & storage | Burton & Likens, 1975; Regester et al., 2006; Briggler et al. 2004 | **Group 3** |
| W 16 Feb | Feeding ecology & digestion I |  | **Quiz 1 due: 10pm** |
| F 18 Feb | **LAB:** Research projects—brainstorming & data demo trials |  | At Zoo Atlanta |
| M 21 Feb | Reproductive biology |  |  |
| W 23 Feb | Sensory Systems | Shubin ch. 8–10 | **Group 4** |
| F 25 Feb | **LAB:** Research at Zoo |  |  |
| **Unit 3** | **Applied Concepts** | **—** | **—** |
| M 28 Feb | Open work on research projects |  |  |
| W 2 Mar | Integument |  |  |
| F 4 Mar | **LAB:** Research at Zoo |  |  |
| M 7 Mar | Applied Concepts I – Coyotes |  | **Group 1 -- Research Proposal due: 10pm** |
| W 9 Mar | Applied Concepts II – Mating Systems |  | **Group 2** |
| F 11 Mar | **LAB:** Research at Zoo |  |  |
| M 14 Mar | Applied Concepts III – Migration |  | **Group 3** |
| W 16 Mar | Applied Concepts IV – Evolutionary Arms-Races |  | **Group 4** |
| F 18 Mar | **LAB:** Research at Zoo |  |  |
| **Unit 4** | **Vertebrate Conservation** | **—** | **—** |
| M 21 Mar | *Spring Break* |  |  |
| W 23 Mar | *Spring Break* |  |  |
| F 25 Mar | *Spring Break* |  |  |
| M 28 Mar | Reproductive Systems I |  |  |
| W 30 Mar | *Megan Wright: topic TBA* |  |  |
| F 1 Apr | **LAB:** Research at Zoo |  |  |
| **Unit 4** | **Vertebrate Conservation** | **—** | **—** |
| M 4 Apr | Reproductive Systems II |  |  |
| W 6 Apr | Conservation Biology I |  |  |
| F 8 Apr | **LAB:** Research data analyses (@ Tech) |  | At Tech: *CULC 483* |
| M 11 Apr | Conservation biology II |  |  |
| W 13 Apr | Virunga film Discussion | Virunga film; READING: Robbins et al., 2011 |  |
| F 15 Apr | **LAB:** Research presentations |  | At Tech: *CULC 483* |
| M 18 Apr | Conservation & Diseases | READINGS: Fisher et al., 2012; Scheele et al., 2019 | Research Papers due: email 10pm |
| W 20 Apr | Genetic Technologies & Conservation |  |  |
| F 22 Apr | **NO LAB** |  |  |
| M 25 Apr | Semester review | **READ: Shubin ch. 11–epilogue** |  |
| W 27 Apr | *No class* |  |  |
| F 29 Apr | *No class* |  |  |
| W 4 May | **Final Exam** | 11:20am–2:10pm | **Final Due before 2:11 pm on Canvas** |
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