

Comparative Vertebrate Biology

EEB 353 (4 credit hours)

Spring 2023

Instructors:

Lecture:

Dr. Arpad Nyari (anyari@utk.edu)

Tuesday & Thursday, 11:20 am to 12:35 pm, Hesler 603

Lab:

Lauren Lyons (msy491@vols.utk.edu)

Wednesday, 2:15 pm to 5:15 pm, Hesler 603

Office hours:

I am available each week on **Thursday** from **2:00 – 4:00pm** in my office in **Walters Academic Building F223** for course-related inquiries. Please contact me via email case this time frame conflicts with your schedule. We can also set up a ZOOM link for anyone wishing to join remotely. Our experienced and dedicated course TA, Lauren, will specify her office hour availability in the lab syllabus.

Format:

Lecture and Labs will be held every week in **Hesler Biology Building 603**. Given the duration and content of this course, class attendance and participation are essential components. Therefore, in order to make the most of these topics, you should make every effort to come prepared and actively engage with the course material. Lab sessions will emphasize topics covered in lectures with additional visuals and examination of specimens, but also highlight new and complementary topics relevant to vertebrate diversification and regional diversity. Lauren will be in contact with more details about lab-related matters and will provide a separate syllabus with additional details on the lab schedule, assignments, and office hours. Lastly, please make sure to check our Canvas page regularly for weekly updates and announcements.

Resources:

In order to understand the many facets that shaped the evolution and diversification of vertebrates, we shall explore the variation in form and function displayed by major vertebrate groups in a comparative framework. To achieve this, we will gain deeper knowledge and understanding of relevant vertebrate morphology, anatomy, development, ecology, and behavior in concert with understanding of phylogenetic relationships, as well as through observations of regional vertebrate natural history.

1. As a reference textbook, I will use **Vertebrate Life**, (10th or 11th ed., by F.H. Pough and C.M. Janis, published by Oxford University Press. This resource is a recommended purchase, but not required for this course, as I will synthesize most chapters for my lectures. You should be able to find a nice used copy of the 10th edition for a reasonable price at many online outlets.
2. I will provide on Canvas a few additional key **scientific articles** from the primary literature that will shed light on some particularly interesting topics for select groups of organisms.
3. **Field guides** to major vertebrate groups: birds, mammals, amphibians and reptiles, and fishes. Recommended are the Peterson's guides, but for birds you can also use the Sibley guide or the National Geographic guide, or even the Merlin app by Cornell Lab of Ornithology.
4. Another great resource are the popular books **Your Inner Fish** by Neal Shubin and **The Ancestor's Tale** by Richard Dawkins. Although not a primary resource for this our course, these are excellent encapsulation of many relevant topics on evolution, developmental biology, and ecology of many emblematic organisms, including our own lineage.

Class Objectives:

Our primary objective in this course is to use a comparative framework to help us understand how vertebrate animals originate, develop, fulfil their eco-physiological functions, and interact with the environment and other organisms. Thus, our lectures and labs will seek to:

- familiarize students with the major morphological, anatomical, and physiological structures and processes shared by vertebrates and exemplify unique adaptations in distinct taxa.
- provide an overview of fundamental developmental processes and terminology for vertebrate groups and integrate the role of development in the evolution of vertebrate structures and functions.
- explore the means and degrees to which the environment influences evolutionary, developmental, and long-term population viability trajectories of vertebrates.
- allow students to become proficient in identifying and classifying the regional vertebrate fauna and also extend these skills to a few select lineages endemic to other regions of the world.
- foster skills of natural history such as observation, identification, interpretation, and evaluation when formulating ideas about vertebrate evolution, development, and ecology.
- engage the primary research literature of vertebrate and be able to synthesize and connect the contents to broader aspects of ecology and evolution of organisms.

Tentative Course Schedule

Week	Dates (Tue & Thu)	Topics
1	Jan. 24 – 26	Course intro and overview
2	Jan. 31 – Feb. 2	Systematics and evolution
3	Feb. 7 – 9	Vertebrate beginnings
4	Feb. 14 – 16	Chordates and jawless fishes → PackBack Deep Dive 1 due Sun., Feb. 19
5	Feb. 21 – 23	Gnathostome Fishes
6	Feb. 28 – Mar. 2	Amphibians
7	Mar. 7 – 9	Evolution of Amniotes → PackBack Deep Dive 2 due Sun., Mar. 12
8	Mar. 14 – 16	→ Spring Break
9	Mar. 21 – 23	Testudines and Lepidosaurians
10	Mar. 28 – 30	Archosaurians → PackBack Deep Dive 3 due Sun., Apr. 2
11	Apr. 4	Mammals, incl. primates and hominins → Spring Recess, Thursday Apr. 6
12	Apr. 11 – 13	Biogeography and movement → PackBack Deep Dive 4 due Sun., Apr. 16
13	Apr. 18 – 20	Ecology and behavior
14	Apr. 25 – 27	Threats and conservation → PackBack Deep Dive 5 due Sun., Apr. 30
15	May 2 – 4	Catch-up and review → Take-home Final Exam, due Sun., May 14

Course Site:

Course related content (lecture slides, any additional papers, lab materials) will be posted on Canvas modules. It is recommended that you check this site weekly for announcements and content updates. Tutorials on using Canvas are available at <http://online.utk.edu/>. Note that I will strive to post lecture slides prior to class, but this might not be possible every time, so thank you in advance for your understanding.

Assessment and grading:

The overall grade for this class will be based on the assessment components outlined below. I will use the standard UT grading scale without minuses. There will be no extra credit offered on an individual basis, only for the entire class, if necessary. Should you have missed class or turned in an assignment late, please contact me in a timely manner to discuss the reasons for such delays.

I assess often because it encourages you to keep up with your studying and helps you learn – every time you have to re-process information you learn more! The quizzes and exams will all be mostly short answer type questions, because these types of assessments encourage you to explain and connect ideas and it helps you learn. *Note that this is a 4 credit hour course, which means that besides spending 4 hours in-class plus lab, for these topics you will have to spend at least 12 hours out of class studying and understanding the material in order to become successful.*

In-class summary quizzes – A total of 12 short answer question quizzes will be given during class periods to score attendance and assess understanding of key processes and terms from past and current topics. These quizzes are unannounced and open book to allow students to review the material and answer 1-2 short questions. The lowest two of these quiz scores will be dropped when calculating the final grade for the class. If a quiz is missed due to absence, that score (zero) will count as the lowest quiz grade.

Written assignments – You will use Deep Dives from the PackBack discussion platform to produce 5 essay reports based on specified selected topics. These assignment types will require you to consult the primary scientific literature and provide a minimum of two cited works as the basis for the essays. On Deep Dives, you'll see the specific assignment details and rubric and as you write and get real time feedback on how you are anticipated to score on each rubric category. Packback will also give you feedback on your sources and help you auto-generate sources in the correct format and serve as a guide to improve your scientific communication and writing skills.

Take-home Exam – At the end of the semester, a final comprehensive exam will assess your understanding of the material through definitions, short answers, and summary essay type inquiries. The emphasis will be on synthesis and analysis of broader connections between a series of essential concepts of vertebrate form and function, evolution, development, and ecology.

Points will be distributed as follows:

	Point Allocation
Quizzes	100 (12 x 10, two lowest dropped)
Take-home Exam	100
Written Assignments (Deep Dives)	100 (5 x 20)
Laboratory	100
TOTAL:	400

Final letter grades will be determined by the total percentage of 500 points accumulated as follows:

90 >	= A	87 – 89	= B+	80 – 86	= B	77 – 79	= C+
70 – 76	= C	67 – 69	= D+	60 – 66	= D	≤ 59	= F

Technology:

While in class, use electronic devices only for class purposes (follow along on slides, taking notes, answering posted questions). Using them for other tasks (shopping, social media, etc.) has been found to lead to a significant drop in student course grades!

Feedback/Comments about the Class:

A formal evaluation of the course will be conducted at the end of the semester through the TNVoice platform. However, your feedback is very important and you are *strongly encouraged* to provide comments about the class and its content over the course of the semester. Constructive comments, be they positive or negative, can only help to make the class a better experience for all involved.

Academic integrity:

Academic dishonesty of any sort will not be tolerated. Plagiarism includes the copying of phrases, portions of sentences or the main ideas from ANYONE (including a classmate) on ANY work submitted for a grade (exams, assignments, quizzes, etc). Submitted work that is not original to the student or generated via AI algorithms (such as ChatGTP) are considered under the umbrella of academic dishonesty. Academic dishonesty also includes assisting other students on quizzes or exams.

You are expected to abide by The University of Tennessee honor statement in Biology and in all of your university activities as pledged in the honor code:

“An essential feature of the University of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

(Undergraduate Catalog)

Depending on the offence, penalties for academic dishonesty range from a minimum of a zero for the assignment, to an F for the course, to the filing of formal academic dishonesty charges seeking dismissal from The University of Tennessee. These choices are at the discretion of the instructor, and can occur in either the lecture or the lab portion of the class.

You should be familiar with the requisites of academic honesty and what constitutes academic dishonesty as outlined in the UT Undergraduate Catalog (<http://catalog.utk.edu/>).

Other useful course-related information:

Disability Services: If you need course adaptations or accommodations because of a documented disability, please contact me privately to discuss your needs. If you have questions or concerns about disabilities or emergency information to share, please contact Disability Services: 100 Dunford Hall; 974-6807 or 865-622-6566 for video phone; Email: ods@utk.edu; Website: <http://ods.utk.edu/>).

Academic Assistance:

Tutoring: The Division of Biology does not offer tutoring services. Contact the Student Success Center and the Academic Support Unit of The Office of Minority Student Affairs for information about tutoring opportunities.

- **Student Success Center:** The comprehensive source for information, services, and resources to assist your success at UT: <http://studentsuccess.utk.edu>
 - 812 Volunteer Boulevard, Greve Hall, room 324
 - 865 974-6641, Email: studentsuccess@utk.edu

Technical Assistance:

Canvas, clickers, or general information technology assistance:

- Help Desk: 865 974 9900 (M – F, 8:00 – 5:00) or online at <http://help.utk.edu/>
 - OIT Walk-In Help Desk: Commons, 2nd floor Hodges Library
- Turning Technologies (clickers): 866 746 3015

Student Health Center: <http://studenthealth.utk.edu/>

1800 Volunteer Boulevard
865 974-3648

Counseling Center: <http://counselingcenter.utk.edu/>

1800 Volunteer Boulevard
865 974-2196, Email: counselingcenter@utk.edu

OTHER RESOURCES FOR STUDENTS:

- One Stop: <http://onestop.utk.edu> (Hodges Library, Ground Floor, 8a-5p M-F)
- Undergraduate Catalogs: <http://catalog.utk.edu/> (Listing of academic programs, courses, and policies)
- Hilltopics: <http://hilltopics.utk.edu/> (Campus and academic policies, procedures and standards of conduct)
- Course Timetable: https://bannersb.utk.edu/kbanpr/bwckschd.p_disp_dyn_sched (Schedule of classes)
- Academic Planning: <http://www.utk.edu/advising> (Advising resources, course requirements, major guides)
- Library: <http://www.lib.utk.edu/> (Access to library resources, databases, course reserves, and services)
- Center for Career Development: <http://career.utk.edu/> (Career counseling and resources; HIRE-A-VOL job search)

----- UNIVERSITY POLICIES -----

*By registering at the university, the student neither loses the rights nor escapes the duties of a citizen. **Enjoying greater opportunities than the average citizen, the university student has greater responsibilities. Each student's personal life should be conducted in a context of mutual regard for the rights and privileges of others.** It is further expected that students will demonstrate respect for the law and for the necessity of orderly conduct in the affairs of the community. Students are responsible for being fully acquainted and for complying with the University catalog, handbook, and other rules and policies relating to students. Failure or refusal to comply with the rules and policies established by the University may subject a student to disciplinary action up to and including permanent dismissal from the University.*

University Civility Statement -- <http://civility.utk.edu/>

"Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability and courteousness. Civility enhances academic freedom and integrity, and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other's well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus."

Emergency Alert System -- <http://safety.utk.edu/>

The University of Tennessee is committed to providing a safe environment to learn and work. When you are alerted to an emergency, please take appropriate action. Learn more about what to do in an emergency and sign up for [UT Alerts](#). Check the emergency posters near exits and elevators for building specific information. In the event of an emergency, the course schedule and assignments may be subject to change. If changes to graded activities are required, reasonable adjustments will be made, and you will be responsible for meeting revised deadlines.

Academic Integrity

"An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

Your role in improving teaching and learning through course assessment

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

Disabilities that constrain learning

Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Student Disability Services (SDS) at 865-974-6087 in 100 Dunford Hall to document their eligibility for services. Student Disability Services will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities.

Accessible Information, Materials, & Technology -- <http://accessibility.utk.edu/>

Wellness -- <http://counselingcenter.utk.edu/> and <http://wellness.utk.edu/>

The *Student Counseling Center* is the university's primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services. The *Center for Health Education and Wellness* is dedicated to a community model that is embodied in the "VOLS HELP VOLS" commitment: *We are all Volunteers. We look out for each other.* The Center manages 974-HELP, the distressed student protocol, case management, the Sexual Assault Response Team, and the Threat Assessment Task Force.