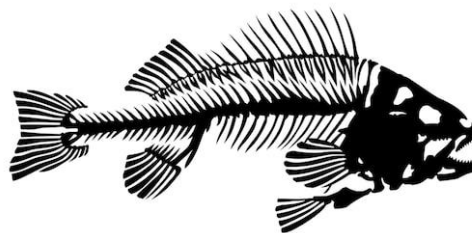


# Biology 3426 – Vertebrate Biology

## Instructor

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Class meetings: MWF 9:30-10:20am; T 12:45-3:25pm  
Office hours: Tuesday, 3:30-5pm; Thursday, 1:30-3:30pm  
*Or by appointment*

Class [Google calendar](#), with all Zoom links (must sign in using tmail)

This course is an evolutionary survey of vertebrates that will focus on major evolutionary innovations and systematic relationships. We will explore major features of the anatomy, physiology, life history, and behavior of fish, amphibians, reptiles, birds, and mammals.

## Course objectives

My Learning Goals for you in this course are as follows:

1. To understand how and why different vertebrate species are related to one another, using the concept of homology.
2. To interpret major evolutionary transitions in vertebrates using phylogenies.
3. To identify structure-function relationships in morphological, behavioral, ecological, and life history traits.
4. To describe the diversity of the major vertebrate groups, including local representatives of each group
5. To address key questions in biology using vertebrates.

In addition, this course is designated as a course that will help you develop skills in Oral and Visual Communication. Upon successful completion of an Oral and Visual Communication (OVC) course, students will have demonstrated the ability to:

1. Identify and use the elements of effective oral and visual communication.
2. Create and deliver effectively structured oral presentations using language correctly and appropriately.
3. Use visual media that are effective, appropriate, and well integrated into the presentation.
4. Analyze and critique oral and visual components of presentations.
5. Respond effectively to questions and comments from audience members.

## Required texts

- *Vertebrate Life* (2018) by Pough and Janis. Pearson, Tenth Edition. (If you have easier access to the ninth edition of *Vertebrate Life* (2012), that is an acceptable alternative for our class.)
- Additional readings will be available on the course TLEARN site.

## Grading and assessment

Exams – 30%

Two in-class examinations and a final exam (10% each) will assess your knowledge of course content and your ability to think critically about and solve problems related to vertebrate evolution. (Learning Goals 1-5)

**“Evolutionary questions” presentations – 30%**

Each student will participate in three 30 minute presentations, working in a team of 2-3 students. In each presentation, you will use information from the course textbook and articles from the scientific literature to address the question posed, and give a PowerPoint (or similar) presentation to the class. (OVC; Learning Goals 1, 2, 3, and 5)

**Texas vertebrate presentations – 10%**

Each student will give two 3 minute PowerPoint presentations on a Texas vertebrate species, during the lab period in which we dissect a representative of that group. (OVC; Learning Goal 4)

**Phylogeny visualization project – 10%**

In this project, students will work in pairs to create a phylogeny with a focus on one major vertebrate lineage, and the synapomorphies that define the evolution of that lineage. (OVC; Learning Goals 1-2)

**Lab quizzes – 10%**

To keep you on track with laboratory material, you will complete ~ 5 lab quizzes. (Learning Goals 1-4)

**Class participation – 10%**

You are expected to actively participate in all class discussions, and lab and field experiences.

**Class attendance**

We will meet three times each week in Zoom. Your presence in class is vital to our classroom community, and is necessary for the development of your understanding of course material. Please attend all course meetings to the best of your ability, and come to class prepared to participate, completing all assigned readings before class. If you must be absent, please let me know ahead of time, whenever possible. Our class sessions will all be recorded and available on TLEARN, so if you miss class, be sure to watch the recording of the session you miss.

Class discussions via Zoom are often most effective when we can see one another, especially because our class is small. However, there are a number of valid reasons why you might not be able to share your video feed, and you will not need to provide an explanation if you need to keep your video off. I encourage you to share your video anytime you can during our class meetings.

**Honor Code**

All students are covered by a policy that prohibits dishonesty in academic work. Under the Honor Code, a faculty member will (or a student may) report an alleged violation to the Academic Honor Council. It is the task of the Council to investigate, adjudicate, and assign a punishment within certain guidelines if a violation has been verified.

Further, any materials created by your instructor to enhance or assess your learning in this class (including but not limited to exams, exam keys, problem sets, and lecture slides) are proprietary materials that may not be shared with anyone without prior authorization from Dr. Johnson. **Sharing these documents in any way is a violation of the Honor Code** and infractions will be reported to the Honor Council. The sale or donation of these materials to any organization that, as a business or community service, provides study aids is included in this policy. This includes providing materials to such organizations over the internet.

Students are required to pledge all written work that is submitted for a grade: “On my honor, I have neither given nor received any unauthorized assistance on this work” and their signature. The pledge may be abbreviated “pledged” with a signature.

**Electronic recording of classroom instruction**

The COVID-19 pandemic requires the delivery of online instruction. For this reason, please be aware that all classroom instruction, including student participation in classroom activities, is subject to recording and dissemination on the University’s secure course management system

(TLEARN). The recordings will be made available only to students enrolled in the course to facilitate online learning and review. Students are expressly prohibited from capturing or copying classroom recordings by any means; violations will be subject to disciplinary action. Instructors who wish to use a recording outside of class must obtain the written consent of any students who are personally identifiable in the recording.

### **Note to students with disabilities**

The University has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Like so many things this fall, the need for accommodations and the process for arranging them may be altered by the COVID-19 changes we are experiencing and the safety protocols currently in place. Students with disabilities who may need some accommodation in order to fully participate in this class are urged to contact Student Accessibility Services, as soon as possible, to explore what arrangements need to be made to assure access. During the Fall 2020 semester, the Student Accessibility Services can be reached by email at [sas@trinity.edu](mailto:sas@trinity.edu).

### **Schedule of course topics, readings, and assignment due dates**

- August 26     *Introduction to the course – why study vertebrates?*
- August 28     *Best practices for presentations and primary literature*
- Chapter 12, Making Sense, Northey and Von Aderkas (TLEARN)
- August 31     *Tree thinking – phylogeny as a framework*
- Chapter 1, Vertebrate Life
- September 2     *The geological time scale*
- Chapters 5, 13, 23, Vertebrate Life (10e); Chapters 7, 15, and 19 (9e)
- September 4     *Introduction to the vertebrates*
- Chapter 2, Vertebrate Life
- September 7     *Origins of the chordates*
- Chapter 3, Vertebrate Life
- September 9     *Continuation of lab activities on jawless vertebrates*
- September 11     **Presentation:** *How did the vertebrate jaw evolve?*
- Reading TBA
- September 14     *Challenges of living in water*
- Chapter 4, Vertebrate Life
- September 16     *Cartilaginous fishes*
- Chapters 6-7, Vertebrate Life (10e); 5 (9e)
- September 18     *Bony fishes*
- Chapters 8-9, Vertebrate Life (10e); 6 (9e)
- September 21     **Presentation:** *How do fish swim?*

- Reading TBA

September 23 *Collaborative exam prep*

September 24-26 **EXAM 1**

September 28 *Challenges of living on land: The evolution of tetrapods*

- Chapters 10 and 12, Vertebrate Life (10e); 8-9 (9e)

September 30 **Presentation:** *How did limbs evolve from fins?*

- Reading TBA

October 2 *Amphibians*

- Chapter 11, Vertebrate Life (10e); 10 (9e)

October 5 **Presentation:** *How do frogs jump?*

- Reading TBA

October 7 *Synapsids vs. sauropsids*

- Chapter 14, Vertebrate Life (10e); 11 and 18 (9e)

October 9 **Fall Break**

October 12 *Ectotherms vs. endotherms*

- Chapters 15 and 20, Vertebrate Life (10e); 14 and 22 (9e)

October 14 **Presentation:** *How is sex determined in vertebrates?*

- Reading TBA

October 16 *Turtles*

- Chapter 16, Vertebrate Life (10e); 12 (9e)

October 19 **Presentation:** *Why do turtles live so long?*

- Reading TBA

October 21 *Lizards, tuatara, and snakes*

- Chapter 17, Vertebrate Life (10e); 13 (9e)

October 23 **Presentation:** *How do snakes eat?*

- Reading TBA

October 26 *Crocodiles*

- Chapter 18, Vertebrate Life (10e); 16 (9e)

October 28 **Presentation:** *Is the global wildlife trade a conservation issue?*

- Reading TBA

October 29-31 **EXAM 2**

- November 2 *Dinosaurs*
- Chapter 19, Vertebrate Life (10e); 16 (9e)
- November 4 *Vertebrates and social media*
- Reading TBA
- November 6 *Collaborative work on upcoming presentations*
- November 9 *Birds*
- Chapters 21-22, Vertebrate Life (10e); 17 (9e)
- November 11 **Presentation:** *How do birds fly?*
- Reading TBA
- November 13 **Presentation:** *How do birds sing?*
- Reading TBA
- November 16 **Presentation:** *Why are there so many kinds of bird eggs?*
- Reading TBA
- November 18 *Mammals*
- Chapter 24, Vertebrate Life (10e); 20 (9e)
- November 20 **Presentation:** *Why are there so many kinds of mammal teeth?*
- Reading TBA
- November 23-27 **Thanksgiving Break**, no class
- November 30 *More mammals*
- Chapter 25, Vertebrate Life (10e); 21 (9e)
- December 2 **Presentation:** *What's so special about milk?*
- Reading TBA
- December 4 **Presentation:** *Are dolphins really that smart?*
- Reading TBA
- December 7 *Primates*
- Chapter 26, Vertebrate Life (10e); 24 (9e)
- December 9-10 *Reading days*
- December 17 **FINAL EXAM**, 8:30-11:30am (flexible schedule for final exam TBD)

*NOTE: This schedule is subject to change as needed. If and when changes occur, announcements will be made in class and on the course TLEARN site.*

## Fall elections

The general election for president and other federal and state offices will be on **Tuesday, November 3, 2020**. If you are a U.S. citizen, voting is one of the main ways you can influence government policies.

- In order to vote in Texas in the general election, you must register to vote no later than **October 5, 2020**. To register to vote in Texas: <https://www.votetexas.gov/faq/registration.html>.
- In Texas, you can vote early. The early voting period starts on the morning of **Tuesday, October 13, 2020** and ends on the evening of **Friday, October 30, 2020**. Click on this link for answers to early voting FAQs: <https://www.votetexas.gov/faq/early-voting.html>.
- Starting in September, you can locate your polling place and its hours for early voting and November 3 voting by clicking on this link: <https://www.votetexas.gov/>.
- You can vote by mail in Texas if you fulfill certain requirements. Get information about voting by mail by clicking on this link: <https://www.sos.texas.gov/elections/voter/regabbm.shtml>.
- If you will be voting in a state other than Texas, click on this link to get information about how to do it: <https://turbovote.org>.

Finally, one of the greatest contributions you can make in the 2020 election is serve as a poll worker. Due to COVID-19, there is a tremendous shortage of people able to operate voting stations. These are **PAID POSITIONS**. You can learn more about these positions, what shifts are available, how much they pay, and how to apply for them here: <https://www.bexar.org/2182/Apply-as-an-Election-Official>.

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## Sexual misconduct reporting

When students experience sexual misconduct, they sometimes seek out a trusted professor with whom to talk. You should know that most faculty and staff are "Mandatory Reporters," including Dr. Johnson. What that means is that I am *required by Texas law* to report any instances of sexual misconduct that I am aware of to the Title IX Coordinator, including sexual harassment, non-consensual sexual intercourse, non-consensual sexual contact, sexual exploitation, intimate partner violence, stalking, and related retaliation. So, if you share information with me about any incidents that implicate the Sexual Misconduct or Anti-Harassment Policies, I am required to report all information to the Title IX Coordinator to make sure you have information about support resources and complaint resolution options. **A "report" does not initiate the complaint process; you are in control over how to engage with our Title IX Coordinator.** Information about reporting is available here: <https://inside.trinity.edu/human-resources/equal-opportunity-services/sexual-misconduct/reporting>. If you wish to talk with someone confidentially who is not a Mandatory Reporter, you may talk with staff in Counseling Services, Health Services, or the University Chaplain. (All other university faculty and staff, including those in Residential Life, are Mandatory Reporters.)

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## Academic support

Trinity faculty hold students to the highest academic standards, but we also know that the very best students seek out help when necessary. The following resources are in place to support your academic success; learn more at [gotu.us/success](http://gotu.us/success):

- Academic Success: time management, student skills, test anxiety, note taking, tutoring
- Career Services: major exploration, career guidance
- Counseling Services: mental health concerns, mental health referrals
- Quantitative Reasoning and Skills Center: quantitatively-demanding coursework
- Student Accessibility Services: accommodations for a diagnosed disability
- Wellness Center: nutrition, sleep, stress management
- Writing Center: starting a paper, finding a thesis, drafting and editing