

BIO 24
Vertebrate Zoology
Class meets 10A: TTh 10:10 AM – 12 PM.
The X-hour is F 3:30-4:20 (we will be using some of the X-hours)

Professor

Ryan G. Calsbeek 338 Life Sci Office Hours: T 1:30-2:30 pm & W 2-3:00 pm

Overview

This course will examine origins, diversity, structure and function within and among the vertebrate classes (including fish, amphibians, reptiles, birds and mammals). We will consider the evolution of the vertebrate body plan and innovations associated with common organ systems (e.g., skeletal, muscular, digestive, sensory, etc.) shared by different taxa. In addition, we will consider specialization of form and function to the diverse ecology of vertebrates as well as the manner in which very different taxa cope with similar habitats and environmental demands. In so doing, we will draw on evolutionary principles such as adaptation, convergent and parallel evolution and evolutionary constraints. **Prerequisites** Bio 15 or 16

Objectives

The objectives of this course are to...

1. *Examine* physical adaptations and constraints across the vertebrates
2. *Investigate* evolutionary outcomes of changes in life history from water to land to air
3. *Apply* these physical, physiological and evolutionary principles to the most common contexts for making a living in the vertebrates (locomotion, mating, social and interspecific interactions).
4. *Integrate* this information and these concepts across the groups.

Readings

I will post readings before each class period on blackboard. Most of these will be from the recommended text book but occasionally we will read papers from the primary literature.

I have set up a CANVAS site (<https://canvas.dartmouth.edu/courses/10711>) for Bio 24. The specific reading assignments for each class, as well as powerpoint slides will be available on Blackboard. Other materials such as sample quiz questions and keys may also be posted. I recommend that you check the site often for newly posted material.

Assessment of Your Academic Performance

I will give two midterms and a final exam, and you will write one term paper (title TBD) during this term. Midterms will be given during class or the Xhour (**Thursday 12-12:50 PM**). You must arrange your schedule such that you can attend the X-hour—no exceptions. If you are taking a course with a lab, please make sure that you do not sign up for a laboratory section that meets on Thursday afternoons. Each midterm will be worth 20% of your grade. The Final Exam (35%) will be cumulative and cover all aspects of the course. The term paper will be worth 15% of your grade. The remainder of your grade will be assessed based on short laboratory exercises and participation.

Academic Honesty

Academic honesty is essential. The following is quoted directly from the Dartmouth College Student Handbook : "Students who submit work that is not their own or who commit other acts of academic dishonesty forfeit the opportunity to continue at Dartmouth."

The complete text of the Academic Honor Principle is in the Student Handbook or at:

(<http://www.dartmouth.edu/~reg/regulations/undergrad/acad-honor.html>). Please read the Honor Principle carefully; **you** are responsible for knowing and understanding the Honor Principle, and adhering to its letter and spirit. Any violations of the Honor Principle in this course will be referred to

the Committee on Standards and may result in your suspension for multiple terms, or, in the most extreme cases, separation from the College.

At Dartmouth, we value integrity, responsibility, and respect for the rights and interests of others, all central to our Principles of Community. We are dedicated to establishing and maintaining a safe and inclusive campus where all have equal access to the educational and employment opportunities Dartmouth offers. We strive to promote an environment of sexual respect, safety, and well-being. In its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based harassment, domestic violence, dating violence, and stalking are not tolerated in our community.

The Sexual Respect Website (<https://sexual-respect.dartmouth.edu>) at Dartmouth provides a wealth of information on your rights with regard to sexual respect and resources that are available to all in our community.

Please note that, as a faculty member, I am obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator. Confidential resources are also available, and include licensed medical or counseling professionals (e.g., a licensed psychologist), staff members of organizations recognized as rape crisis centers under state law (such as WISE), and ordained clergy (see <https://sexual-respect.dartmouth.edu/reporting-support/all-resources/confidential-resources>).

Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator or the Deputy Title IX Coordinator for the Guarini School. Their contact information can be found on the sexual respect website at: <https://sexual-respect.dartmouth.edu/reporting-support/all-resources/campus-resources>

COVID-19 Information

Attendance:

You are expected to attend class in person unless you have made alternative arrangements due to illness, medical reasons, or the need to isolate due to COVID-19. For the health and safety of our class community, please: **do not attend class when you are sick**, nor when you have been instructed by Student Health Services to stay home. Please arrange with your professor how to catch up on any course material that you miss.

Safety:

In accordance with [current College policy](#), all members of the Dartmouth community are required to wear a suitable face covering when indoors, regardless of vaccination status. This includes our classroom and other course-related locations, such as labs, studios, and office hours. If you need to take a quick drink during class, please dip your mask briefly for each sip. Eating is never permitted in the classroom. (The only exception to the mask requirement is for students with an approved disability-related accommodation; see below.) If you do not have an accommodation and refuse to comply with masking or other safety protocols, I am obligated to assure that the Covid health and safety standards are followed, and you will be asked to leave the classroom. You remain subject to course attendance policies, and dismissal from class will result in an unexcused absence. If you refuse to comply with masking or other safety protocols, and to ensure the health and safety of our community, I am obligated to report you to the Dean's office for disciplinary action under the Guarini School's [Standards of Conduct](#). Additional COVID-19 protocols may emerge. Pay attention to emails from the senior administrators at the College.

Accommodations:

Students requesting disability-related accommodations and services for this course are required to register with Student Accessibility Services (SAS; [Getting Started with SAS webpage](#); student.accessibility.services@dartmouth.edu; 1-603-646-9900) and to request that an accommodation email be sent to me in advance of the need for an accommodation. Then, students should schedule a follow-up meeting with me to determine relevant details such as what role SAS or its [Testing Center](#) may play in accommodation implementation. This process works best for everyone when completed as early in the quarter as possible. If students have questions about whether they are eligible for accommodations or have concerns about the implementation of their accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

Special Circumstances

I encourage students with learning, physical, or psychiatric disabilities that may need special classroom accommodations to make an appointment to see me by the end of the second week of the term. All discussions will be confidential, although we may need to consult the Student Accessibility Services office to discuss implementation of special requests. I recognize that some students may wish to take part in religious observances that fall during the term. Should you have a religious observance that conflicts with your participation in the course, please speak with me by then end of the second week of the term to discuss appropriate accommodations.

Important Dates:

Midterm I (25%) Lectures 1-7: (October 4 in class)
Midterm II (25%) Lectures 8-17: (October 29 in class)
Final Exam (cumulative) (35%): (TBD)
Term Paper (15%): in class

Lecture Schedule:

1. Vertebrate origins 9/14
2. Evolutionary Process 9/14
 3. Axial Skeleton 9/16
 4. Bone 9/21

The Fishes

5. Fish origins (*adaptive radiation of cichlids*) 9/21
6. Life under water (*physiology I*) 9/23
7. Fish locomotion (*physiology II*) 9/28
8. Fish reproduction and behavior (*sex allocation theory*) 9/28

MIDTERM 1 10/2

Amphibians

9. Tetrapod origins and amphibian lifehistory 9/30
10. Amphibian phys; lingual feeding (*constraints, natural selection as a problem solver*) 9/30
11. Lifehistory II and amphibian mating (*plasticity and mosaics*) 10/5
12. Amphibian biodiversity and speciation (*ring species*) 10/7

Term paper due October 11 (tentative)

Reptiles:

13. Endothermy vs. ectothermy (discussion, debate, and lecture) 10/12
14. Reptile locomotion 10/14
15. Behavior and reproduction (*cryptic choice*) 10/14
16. Tradeoffs (*lifehistory evolution, growth/dimorphism, metamorphosis*) 10/19
17. endocrine system 10/19

Birds

18. Flight (*physiology*) 10/28

MIDTERM 2 11/4

19. Communication (*learning and cognition*) 11/2

20. Reproduction and behavior (*lekking*) 11/9

Mammals

21. Mammal Origins 11/11

22. Locomotion in mammals (*walking versus running, performance*) 11/11

23. Marine Mammals 11/16

24. Language acquisition (*log-transformations and brain size*) 11/16

11/16 review session

Final EXAM date/time will be posted online