BIOL 347: Biology of Vertebrates
Spring 2023, MWF 9:30–10:20AM Newton 212
Lab Tu 9:30AM–12:20PM ISC 105

Course Objectives:
This course is designed to provide a survey of the classification, structure, physiology, behavior, and ecology of the classes of vertebrate life through lectures and laboratory exercises.

Learning Outcomes:
By the end of the course, students should be able to:
1. Make and interpret phylogenetic classifications (evolutionary relatedness) and explain in writing their significance in contemporary vertebrate biology.
2. Describe the evolutionary history of vertebrates supported by phylogenetic analysis and the fossil record and explain how these criteria support that history.
3. Analyze form-function relationships and recognize and explain examples of adaptation and constraint.
4. Demonstrate a strong understanding of the evidence for the occurrence of evolution and analyze critically examples of objections and misinformation.
5. Use scientific knowledge to interpret examples and experimental data and address real-life problems involving vertebrates.
6. Communicate knowledge of vertebrates in a variety of formats.

Instructor:
Dr. Sara Burch, ISC 358, burch@geneseo.edu

Office Hours:
Mon 10:30AM–12:30PM, Tues 1:30–2PM & 3:15–4PM, or by appointment.

Required Textbook:
Pough, Bemis, McGuire & Janis. *Vertebrate Life*, 11th Ed (2022). ISBN: 9780197564882
Note: You can use the 10th edition of this book, but please no earlier editions than that. There is no required lab manual. Dissection guides and other resources will be available on Canvas and in lab. These materials MUST remain in lab for all to use.

Additional Resources:
Brightspace: Lecture slides, videos, and worksheets will be made available on the course Brightspace page. Additional resources such as helpful reading, relevant articles, and sample test questions may also be posted.

Laboratory materials: In labs with preserved specimens, you will need eye protection, and you may optionally want a lab coat. In such labs, you cannot wear open-toed shoes at all, and cannot wear shorts without a lab coat. You will want a binder or folder to keep lab handouts in. All other lab materials are provided.

Assignments:

Lecture Assignments: Each week, there will an assignment or assignments totaling 5 points. The nature of the assignments will vary from week to week, and may include activities through Canvas, traditional homework, as well as in-class activities paired with pre-class videos.

In-Lab Activities: The lab worksheets are assignments completed in the weekly lab, and are turned in at the end of the lab period. There are 11 of these, worth 5 pts. each.

Class Presentation: The class presentation consists of groups giving a presentation on a vertebrate family. I expect that each student will be involved in the research, production, and presentation of each presentation. Each presentation should be about 15 minutes in length (remember that that each slide typically takes 30 sec to 1 min to present). Participation will be partly assessed by group self-evaluation, whereby you will each evaluate the participation of the other member in your group. Please practice your presentation ahead of time to be more eloquent and efficient with your presentation. I will be happy to look over your slides before your presentation to give you suggestions for improvements.

Lab Atlas: For this assignment, you will produce an atlas of comparative anatomy based on the materials in the lab. The atlas will include bolded terms from the labs (excluding the first two labs) illustrated and labeled. A key and guide materials are available on Canvas. The first atlas covers fish and amphibians, and the second covers amniotes.

Wikipedia-style article: You will produce a Wikipedia-style article for a vertebrate species which is currently only represented by a "stub" or without a page. Using a combination of primary and secondary sources, you will expand what is written about the species covering such topics as appearance, reproduction, range, behavior, habitat, conservation, and any other applicable factors.

Exams: There will be three exams, each worth 50 points. The exams consist of multiple choice and short answer questions. Although each exam will emphasize the most recent material, the course content is naturally cumulative. As such, later exams will call for making connections to earlier material. Information from lab will be helpful in lecture and vice-versa, although lab material will not be explicitly tested in the exams.

Grades:

Exams (3)	25%
Quizzes (3)	10%
Wikipedia-style Article	20%
Lecture Assignments	10%
Lab Atlas (2)	20%
Lab Worksheets	5%
Presentation	10%
	100%

The grading scale for this course is the following:

A: 93%–100%	A–: 90%–92%	B+: 87%–89%	B: 83%–86%
B–: 80%–82%	C+: 77%–79%	C: 73%–76%	C–: 70%–72%
D: 60%–69%	E: <59%		

Course Policies and Resources

Exam Excuse Policies

Make-up exams and quizzes will only be given in cases of extenuating circumstances (a direct and unavoidable conflict of an academic or professional nature). Vacations, weddings, and leaving early for holidays are not acceptable excuses for taking an exam early or late. If you can't make the scheduled exam date you must contact Dr. Burch at least **ONE WEEK PRIOR** to the exam time. In cases of severe illness, family affairs, or quarantine restrictions, please contact Dr. Burch as soon as you are able to schedule accommodations.

Attendance

Although class attendance is not graded per se, you must attend classes and labs in order to complete both in- and out-of-class assignments. Failure to come to class (or make arrangements ahead of time) will make it difficult to accomplish these assignments successfully. **However, do not come to class or lab with symptoms of COVID-19.** If you are feeling unwell on a day that class meets in-person, do not attend. Remember that it is better to stay home if you are not feeling well than to attend class and risk spreading illness to others.

Communication

You should feel free to email me whenever you have a question or concern about the course, and I will get back to you as soon as we are able. However, please do not expect a response outside of regular business hours (9am–5pm M–F) or within 24 hours, because I may not see your email right away.

Health and Well-being

Your health and well-being are foundational to your ability to learn, and if you find that you are feeling unwell (physically or mentally) and it is impacting your ability to complete your coursework, please reach out. Concerns about academic performance, health situations, family health and wellness (including the loss of a loved one), interpersonal relationships and commitments, and other factors can contribute to stress. Students are strongly encouraged to communicate their needs to faculty and staff and seek support if they are experiencing unmanageable stress or are having difficulties with daily functioning. The Dean of Students (585-245-5706) can assist and provide direction to appropriate campus resources. For more information, see http://www.geneseo.edu/dean_students. Please see the Canvas page titled "Academic & Personal Support Resources" (linked on the front page) for a complete list of on and off-campus resources to help.

Academic Dishonesty

Academic dishonesty includes cheating, knowingly providing false information, plagiarizing, and any other form of academic misrepresentation. In this course, consequences of a first offense are a zero (0) on the relevant assignment or exam. Consequences of a second offense are a failing grade (E) overall in the course. All work must be your own. You also may not use a large language model, such as OpenAI's chatGPT, to edit or generate text because it is not guaranteed to be free from using the intellectual products of others. For the college's fully policy, see: https://www.geneseo.edu/handbook/academic-dishonesty-policy

Accommodations:

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with physical, emotional, or cognitive disabilities to ensure equal access to academic programs, activities, and services at Geneseo. Students with letters of accommodation should submit a letter to each faculty member and discuss their needs at the beginning of each semester. Please contact the Office of Accessibility Services for questions related to access and accommodations. Office of Accessibility Services in Erwin Hall 22 or access@geneseo.edu or 585-245-5112.

Land Acknowledgment

Land acknowledgements are expressions of sorrow and remembrance to those whose historic territory one resides on. Geneseo resides on the homeland of the Seneca Nation of Indians and Tonawanda Seneca Nation. We encourage you to learn more about these original occupants and those indigenous to other places you have lived. You may consider using the Native Land app and/or websites such as sni.org to learn more about the community of more than 7,000 enrolled Indigenous Peoples.

Lecture Schedule

DATE			TOPIC	READING
Jan	25	W	1. Intro to Vertebrate Diversity	Chapter 1.1
	27	F	2. Phylogenetics	Chapter 1.2–1.4
	30	M	3. Paleontology	Chapter 1.5
Feb	1	W	4. Chordates	Chapter 2.1–2.2
	3	F	5. Vertebrate Origins **[HW DUE]**	Chapter 2.3–2.6, 3.1–3.2
	6	M	6. Agnathans	Chapter 3.1–3.3
	8	W	7. Origin of Jaws **[QUIZ]**	Chapter 3.4–3.6
	10	F	8. Early Gnathostomes **[HW DUE]**	Chapters 3.7, 6, 7.1, 7.4
	13	M	9. Chondrichthyes	Chapter 4.2, 6 & 7
	15	W	10. Osteichthyes	Chapter 8.1–8.2, 9.1

DATE			TOPIC	READING
	17	F	11. Actinopterygii **[In-Class Activity]**	Chapter 4.1, 9.2–9.4
	20	M	12. Sarcopterygii	Chapter 8.3, 9.7
	22	W	13. Review	
	24	F	**EXAM 1**	
	27	M	14. Transition to Land	Chapter 10.1–10.2, 12
Mar	1	W	15. Early Tetrapods **[In-Class Activity]**	Chapter 9
	3	F	16. Lissamphibia I	Chapter 10.3, 12
	6	M	17. Lissamphibia II	Chapter 11.1
	8	W	18. Amniotes/Life on Land **[HW DUE]**	Chapter 11.2–11.6
	10	F	19. Synapsida **[QUIZ]**	Chapter 10.4
	13	M	NO CLASS – SPRING BREAK	
	15	W	NO CLASS – SPRING BREAK	
	17	F	NO CLASS – SPRING BREAK	
	20	M	20. Mammals I	Chapter 25.1–25.3
	22	W	21. Mammals II **[HW DUE]**	Chapter 25.4–25.6
	24	F	22. Primates to Humans	Chapter 26.1–26.6
	27	M	23. Lepidosauria I	Chapter 17.1–17.2, 17.4
	29	W	24. Lepidosauria II **[HW DUE]**	Chapter 17.3, 17.6–17.10
	31	F	25. Life Without Limbs	Chapter 17.1, 17.5
Apr	3	M	26. Review	
	5	W	**EXAM 2**	
	7	F	27. Archosauria I (Crocodylians)	Chapter 18
	10	M	28. Archosauria II (Pterosaurs)	Chapter 19.2, 19.5
	12	W	29. Archosauria III (Dinosaurs)	Chapter 19.1, 19.6–19.10
	14	F	30. Endothermy vs Ectothermy **[HW DUE]**	Chapters 9.6, 12.7, 15, 19.11, 20
	17	M	31. Aves I **[Wiki Topic/Sources Due]**	Chapter 21, 22.1
	19	W	32. Aves II	Chapter 22.3–22.11
	21	F	33. Flight **[QUIZ]** **[In-Class Activity]**	Chapter 21.2, 22.1–22.2
	24	M	34. Sauropterygia	Chapter 19.3

DATE			TOPIC	READING
	26	W	NO CLASS – GREAT DAY	
	28	F	35. Testudines I	Chapter 16.1
May	1	M	36. Testudines II **[Wiki Article Due]**	Chapter 16.2–16.5
	3	W	37. Feeding	
	5	F	38. Life Underground **[HW DUE]**	
	8	M	39. Mass Extinctions	Ch. 5.5, 13.5, 23.5, Ch. 26.7
	10	W	40. Review	
	12	F	**EXAM 3: 8:00–10:30AM**	

Lab Schedule

DATE	LAB	TOPIC
Jan 24	1	Intro to Vertebrate Morphology
Jan 31	2	Phylogenetics
Feb 7	3	Lamprey & Jaws
Feb 14	4	Chondrichthyes
Feb 21	5	Osteichthyes
Feb 28		NO LAB – DIVERSITY SUMMIT
Mar 7	6	Amphibians
Mar 14		NO LAB – SPRING BREAK
Mar 21		Work on Atlas I **[DUE March 26 at 11:59PM]**
Mar 28	7	Mammals
Apr 4	8	Lepidosaurs
Apr 11	9	Archosaurs
Apr 18	10	Birds
Apr 25		**Group Presentations**
May 2	11	Testudines
May 9		Work on Atlas 2 **[DUE May 14 at 11:59PM]**