Evolution of Vertebrates (Biology 3219)

Course description:

Survey of vertebrate animals with an evolutionary and paleontological perspective on adaptive features. Lab sessions examine morphological, anatomical, and behavioural characteristics, with special reference to comparative locomotory, feeding, and reproductive strategies.

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Please note: I attend to my email regularly from Monday to Friday during the academic year so I will typically respond to your messages on a same day basis during the week. However, I may not open emails that have been sent from accounts other than your university account (e.g., hotmail) so please use your *lakeheadu.ca* email for all of your messages.

Office hours:

I offer regular weekly office hours during the term through Zoom (time/day TBA). Office hours will also be available through Zoom by appointment; just email me to set up an appointment.

Learner goals:

Upon satisfactory completion of this course, the student will be able to:

1. Describe the origins and evolution of vertebrate taxa, and identify their relationships to their closest living and nonliving relatives.
2. Articulate current views of vertebrate systematics, conservation, and biodiversity.
3. Describe how many novel innovations evolved in vertebrates, and how this contributed to the diversity of extant vertebrate life.
4. Discuss how vertebrate taxa are adapted to feed, reproduce, and move from place to place.
5. Describe aspects of functional anatomy and behaviour in vertebrates, and explain how it is adaptive.
6. Articulate the mechanisms associated with mass extinctions, and describe how they changed the biotic and abiotic profiles of Earth.
7. Appreciate and practice the handling of vertebrate specimens for scientific research and educational purposes.
8. Predict aspects of the natural history of vertebrates from observations of morphology.

Lectures:

1. All lectures will be delivered remotely by Zoom at the scheduled time; you can find links to the Zoom lectures on the D2L calendar. Attendance is highly recommended. Lecture notes will not be provided, and PDFs of slides only show a brief outline of the course material. The things that I say during lectures are important!

2. There is no textbook; however, extensive resources are available on the D2L course website, including PDF of lecture slides, glossaries, videos, and on-line study aids.

3. There are two online lecture tests worth 25% (midterm) and 30% (final). They will occur during regular class time, and are not cumulative. There is no final exam during the April final exam period. Please remember that you must do these online tests alone (no help or collaboration!). Collaboration on tests is considered cheating. Also, cutting and pasting, copying, or downloading answers from another source (e.g., Wikipedia) is considered plagiarism. The minimum penalty for plagiarism or collaboration on the tests will be a mark of zero on the test. You can find more information on the D2L course webpage.

4. If you miss a test due to illness or other valid reason, you must inform me by email within 24 hours of the scheduled test time; otherwise, you may not be able to write a make-up test.

Labs:

1. Labs will be offered in person. The lab manual is available on D2L. You are responsible for all material presented during labs and in the lab manual, and posted to the supplementary lab materials on D2L.

2. There are three online lab quizzes that will occur during the scheduled lab time. Lab quizzes begin promptly at 2:30. You will not be able to write the lab quizzes at other time. You will not be able to begin the quiz late, and any questions answered after the quizzes close will not be marked. See D2L for more information regarding these quizzes. Material covered on the lab quizzes is as follows:
    Lab quiz 1: Lab 1 (Integuments and Skeletons)
    Lab quiz 2: Lab 2 (Aquatic Locomotion) and Lab 3 (Feeding: Form and Function)
    Lab quiz 3: Lab 4 (Terrestrial Locomotion) and Lab 5 (Flight)

Assignments:

1. You will be required to write three fossil species accounts that follow a specific format; an information sheet regarding the fossil species account project and a marking rubric is available on D2L. Please remember that you must select species that are extinct and only known from the fossil record. Species must be selected from the following taxa:
    Fossil species account 1: Fish and amphibians
    Fossil species account 2: Birds and reptiles
    Fossil species account 3: Mammals

Fossil species accounts must be submitted as a PDF file to the appropriate D2L dropbox. This work must be referenced (in-text citations and reference list at end of account; see information on D2L regarding referencing requirements)! Any form of plagiarism (e.g., copying, cutting-and-pasting, paraphrasing without referencing) will result in a grade of zero. I will be checking so be forewarned! If you are unsure as to what constitutes plagiarism, please make an appointment with me so that we can discuss it. Late accounts will be accepted; however, 0.5% (out of the total 5%) will be deducted for each day that the assignment is late.

Additional information:

1. I am committed to providing a learning environment that will give all students the best possible chance of success in this course. Please drop into my Zoom office hours (or make an appointment) if I can be of assistance.

2. For students registered with Student Accessibility Services, I can offer many solutions for your recommended accommodations. Please feel free to make an appointment and we can discuss these options.

3. Please note that I have a zero-tolerance policy on cheating and plagiarism. The minimum penalty for cheating or plagiarism will be a mark of zero on the test or assignment, and a report may be sent to the Dean and kept on file at the Office of Student Affairs. Not reading this is not an excuse for not knowing it!

Grading scheme and due dates:

Midterm test	February 28	25%
Final test	March 30	30%
Lab quiz 1	January 25	10%
Lab quiz 2	February 15	10%
Lab quiz 3	April 5	10%
Fossil species account 1	February 26	5%
Fossil species account 2	March 19	5%
Fossil species account 3	April 9	5%

Lecture Topic Outline

January 10	Unit 1	Introduction/Vertebrate Diversity
January 12	Unit 1/2	Classification/Chordate bauplan
January 17	Unit 2	Vertebrate bauplan
January 19	Unit 3	Early vertebrates and agnathans
January 24	Unit 4	Gnathostome bauplan; Life in water
January 26	Unit 5	Early gnathostomes
January 31	Unit 6	Chondrichthyans
February 2	Unit 7	Major radiation of fishes: Osteichthyans
February 7	Unit 8	Tetrapod origins and the invasion of land
February 9	Unit 9	Extant amphibians: Lissamphibians
February 14	Unit 10	Evolution of amniotes; Anapsids
February 16	Unit 11	Lepidosaurs
February 21/23		**Study week**
February 28		**Midterm test (Units 1-9)**
March 2	Unit 12	Mesozoic archosaurs/Crocodilians
March 7		
March 9	Unit 13	Evolution of birds
March 14	Unit 14	Avian flight
March 16	Unit 15	Avian ecology and behaviour
March 21	Unit 16	Rise of mammals
March 23	Unit 17	Monotremes and marsupials
March 28	Unit 18	Eutherians
March 30		**Final test (Units 10-18)**
April 4/April 6		**No lectures**

Laboratory Topic Outline

January 11	No lab
January 18	**Lab 1 (Integuments and Skeletons)**
January 25	**Lab Quiz 1 (Lab 1)**
February 1	**Lab 2 (Aquatic Locomotion)**
February 8	**Lab 3 (Feeding: Form and Function)**
February 15	**Lab Quiz 2 (Labs 2 and 3)**
February 22	**Study Week**
March 1	No lab
March 8	**Lab 4 (Terrestrial Locomotion)**
March 15	No lab
March 22	**Lab 5 (Flight)**
March 29	No lab
April 5	**Lab Quiz 3 (Labs 4 and 5)**