

## Evolution of Vertebrates (Biology 3219)

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**Professor:** Dr. Janice M. Hughes  
Office: CB 4052

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### Office hours:

Office hours by appointment are available and encouraged. Contacting me by email is best. Also, I am always in attendance in the labs.

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### 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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**Required lab manual:** Hughes, J. M. *Evolution of Vertebrates Lab Manual*.  
(Download from D2L course webpage)

**Optional textbook:** Pough, Janis, and Heiser. *Vertebrate Life*. Prentice Hall.  
(Older editions \$20-40 on Amazon)

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### Please note the following:

#### Lectures:

1. Attendance in lectures is highly recommended. Lecture notes are not provided, and PDFs of slides only give an outline of course material. The things that I say in class are important!
2. There is no textbook for this course; however extensive resources are available on the D2L course webpage, including PDF outlines of lecture slides, glossaries, taxonomies, and marking rubrics.
3. There are two lecture tests totalling 50% of the course grade. They are not cumulative. These tests will be held in class (not online as in previous years). There is no exam during the final exam period in April.

4. If you miss a test due to illness, you must (1) inform me by email within 24 hours of the scheduled test time, and (2) provide a doctor's note within 5 days of the missed test that explains your absence. Otherwise, you will not be able to write a make-up test. Athletes who will miss a test due to out-of-town competitions must provide a letter or email from their coach in advance that clearly shows the dates of their competitions.

### **Labs:**

1. Students taking this course will be required to observe and/or handle study skins, skeletons, and preserved specimens during the laboratory sessions. Those who are uncomfortable with this practice should not register in this course. There are no dissections.
2. Attendance in the labs is highly recommended because there is no review lab prior to the lab exam. Make sure that you have a good understanding of the material before you leave the lab. I will be present in each lab so please ask questions!
3. There will be a bell-ringer lab exam held on April 1 worth 30% of the course grade. More information about this test will be provided in class.

### **Assignments:**

1. Three labs have short assignments that must be completed and handed in during the lab session. There will be no opportunity to make up missed lab assignments.
2. Fossil species accounts are due March 5; please submit a PDF file to the D2L dropbox. More information will be provided on the D2L course webpage and in class. This work must be referenced! 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 so that we can discuss it. Late accounts will be accepted; however, 1.5% (out of the total 15%) will be deducted for each day the assignment is late.
3. The dinosaur project may be done instead of the fossil species accounts. Groups of two or three students may work together on one dinosaur.
  - a. The dinosaur is due at the beginning of the March 18 lab. In addition, three "progress reports" in video or photo format must be uploaded to the course D2L webpage on (or just before) February 3 and 24 and March 16 or this project will not be marked! See the course webpage for more information about this requirement.
  - b. Bonus marks will be given for a complete dinosaur (that looks like a dinosaur!) handed in on time. More information will be provided in class.
  - c. Please note: The dinosaur is a very time-consuming project that cannot be done at the last minute, so don't procrastinate! It is best to start early and work steadily throughout the term. If you start a dinosaur and then decide that you cannot finish it on time, you may switch to the fossil species account project. Note that the fossil species accounts are due approximately two weeks before the dinosaur so you must make this decision before March 5.

**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 come and see me during office hours (or by appointment), or talk to me in class or lab, if I can be of assistance.
2. For students registered with Student Accessibility Services, I can offer many solutions for your recommended accommodations. Please 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 will be sent to the Dean. Not reading this is not an excuse for not knowing it!

**Grading scheme:**

Lab assignment 1	January 29	2%
Midterm test	February 25	25%
Lab assignment 2	February 26	2%
Fossil species accounts	March 5	15%
Lab assignment 3	March 18	1%
Dinosaur (optional)	March 18	15% (plus bonus)
Final test	March 26	25%
Lab exam	April 1	30%

## Lecture Topic Outline

January 7	Unit 1	Introduction/Vertebrate Diversity
January 9	Unit 1/2	Classification/Chordate bauplan
January 14	Unit 2	Vertebrate bauplan
January 16	Unit 3	Early vertebrates and agnathans
January 21	Unit 4	Gnathostome bauplan; Life in water
January 23	Unit 5	Early gnathostomes
January 28	Unit 6	Chondrichthyans
January 30	Unit 7	Major radiation of fishes: Osteichthyans
February 4	Unit 8	Tetrapod origins and the invasion of land
February 6	Unit 9	Extant amphibians: Lissamphibians
February 11	Unit 10	Evolution of amniotes; Anapsids
February 13	Unit 11	Lepidosaurs
February 18/20		<b>Study week</b>
February 25		<b>Midterm test (Units 1-9)</b>
February 27	Unit 12	Mesozoic archosaurs/Crocodylians
March 3		
March 5	Unit 13	Evolution of birds
March 10	Unit 14	Avian flight
March 12	Unit 15	Avian ecology and behaviour
March 17	Unit 16	Rise of mammals
March 19	Unit 17	Monotremes and marsupials
March 24	Unit 18	Eutherians
March 26		<b>Final test (Units 10-18)</b>
March 31/April 1		<b>No lectures</b>

**Laboratory Topic Outline**

January 8		<b>No lab</b>
January 15	Lab 1	Integuments and skeletons
January 22		<b>No lab</b>
January 29	Lab 2	Aquatic locomotion
February 5		<b>No lab</b>
February 12	Lab 3	Feeding: Form and function
February 19		<u>Study week</u>
February 26	Lab 4	Terrestrial locomotion
March 4		<b>No lab</b>
March 11	Lab 5	Flight
March 18	Lab 6	Sensory systems
March 26		<b>No lab</b>
April 1		<u>Lab exam</u>