**COURSE SYLLABUS**

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| COURSE TITLE: | BIOL 361 Vertebrate Biology |
| COURSE CODE: | 22577  | TERM: | Winter 2019 |
| COURSE CREDITS: | 3.0 | DELIVERY: | Lecture & Practicum (Lab) |
| CLASS SECTION:LECTURE LOCATION:LECTURE TIME:WEBSITE:  | 01rm 125 Biology Bldg9:30-10:20 am M/W/Fvia PAWS/Blackboard | START DATE:LAB LOCATION:LAB TIME: | 4 Jan 2019 (lectures)9 Jan 2019 (labs)rm 218 Biology Bldg1:30-5:20 pm Wednesday  |

# Course Description

# An introduction to the biology of fishes, amphibians, reptiles, birds and mammals. The course will consist of a brief phylogenetic survey and an examination of the evolution of different vertebrate body systems. Emphasis will be placed on comparative morphology, embryology and physiology.

# Prerequisite(s): BIOL 121 and 224 (formerly BIOL 203). Note: Students with credit for BIOL 351 may not take this course for credit.

# Learning Outcomes

By the completion of this course, students will be expected to:

1. Explain at an introductory level the embryological origin of organ systems within the vertebrate body

2. Explain the major evolutionary relationships within vertebrate animals and their closest relatives

3. Articulate the language of anatomy, embryology and phylogeny at an introductory level

4. Identify and name anatomical structures in representative vertebrates

5. Know key events in the evolution of vertebrates and explain the major changes in the embryology and anatomy of the vertebrate body that accompanied this evolution

6. Incorporate the scientific literature into textbook knowledge about the animal tree of life and adapt their own knowledge as new information is generated.

Note: The University of Saskatchewan Learning Charter is intended to define aspirations about the learning experience that the University aims to provide, and the roles to be played in realizing these aspirations by students, instructors and the institution. A copy of the Learning Charter can be found at: <http://www.usask.ca/university_secretary/LearningCharter.pdf> More information on University policies on course delivery, examinations and assessment of student learning can be found at: <http://policies.usask.ca/policies/academic-affairs/academic-courses.php>

# Course Overview

The course consists of 75 minutes of lecture on the T/Th schedule, starting on Jan 5 2017 and ending on Apr 6 2017. This will result in 25 days of lectures during the term (approximately 31 hours of face-to-face instruction in the lectures). Twelve afternoons of hands-on lab exercises also included in this course. In these exercises, you will work in groups of five to perform anatomical dissections and work with preserved animal specimens. The laboratories are designed as a practical illustration of vertebrate anatomy and phylogeny, and are coordinated with lecture concepts as shown in the schedule below. The labs are where you will learn the language of vertebrate anatomy. Completion of the labs is a required course component. Note that the lab periods are scheduled for 3 hrs 50 minutes per afternoon; students need to make themselves available for this entire time period. Four lab exams spaced through out the course will test your learning of vertebrate anatomy. These exams are based on a spot test format where you will be given one minute to identify an anatomical structure or answer a short question. The lab tests are not comprehensive (ie they will each cover only the newest material learned in the lab), but the final lecture exam will integrate the laboratory material with the more general concepts taught in the lectures. In other words, you will be asked to answer a “concept” question using the language of anatomy. There is no midterm exam in this course.

# Class Schedule

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| **Week/****Dates** | **Major Lecture Topics**Textbook reading is underlined\* | **Laboratory Activity**Dissection manual reading is underlined\* |
| Week 1Jan 4 | Course Introduction, Morphological Concepts, Overview of Animal Phylogeny; | *No lab this week* |
| Week 2Jan 7 Jan 9Jan 11 | Origin of the VertebratesEmbryological ConceptsTextbook: Chapters 1, 2 & 3 | *Jan 9* Examples of Deuterostome DiversityVertebrate Embryology Dissection manual: Chapter 1 Supplementary Material |
| Week 3Jan 14Jan 16Jan 18 | Embryological ConceptsTextbook: Chapter 5 | *Jan 16*Protochordate Morphology Agnathan MorphologyDissection manual: Chapters 1 2 & 3Supplementary Material |
| Week 4Jan 21 Jan 23Jan 25 | Phylogeny of the Skeletal SystemTextbook: Chapters 7, 8 & 9 | *Jan 23*Anatomy of the IntegumentSkeletal System AnatomyDissection manual: Chapters 4 & 5 |
| Week 5Jan 28Jan 30Feb 1 | Phylogeny of the Skeletal SystemTextbook: Chapters 7, 8 & 9 | *Jan 30****Lab Exam #1 to end of Integument***Skeletal System AnatomyDissection manual: Chapter 5 |
| Week 6Feb 4Feb 6Feb 8 | Phylogeny of the Skeletal SystemPhylogeny of the Muscular SystemTextbook: Chapters 7, 8, 9 & 10 | *Feb 6*Skeletal System Anatomy Dissection manual: Chapter 5 |
| Week 7Feb 11 Feb 13Feb 15 | Phylogeny of the Muscular SystemTextbook: Chapter 10 | *Feb 13****Lab Exam #2*** on skeletal systemMuscular System Anatomy Dissection manual: Chapter 6 |
| Feb18-22 | No Lectures – Midterm Break | No Lab – Midterm Break |
| Week 8Feb 25 Feb 16Mar 1 | Phylogeny of the Digestive SystemTextbook: Chapter 13 | *Feb 27*Muscular System Anatomy Dissection manual: Chapter 6 |
| Week 9Mar 4Mar 6Mar 8 | Phylogeny of the Digestive SystemPhylogeny of the Respiratory SystemTextbook: Chapter 11& 13 | *Mar 6*Muscular System Anatomy Dissection manual: Chapter 6 |
| Week 10Mar 11Mar 13Mar 15 | Phylogeny of the Respiratory SystemPhylogeny of the Circulatory SystemTextbook: Chapter 11 & 12 | *Mar 13:****Lab Exam #3*** on muscular systemDigestive Circulatory & Respiratory System Anatomy Dissection manual: Chapter 7 & 8 |
| Week 11Mar 18Mar 20Mar 22 | Phylogeny of the Circulatory SystemPhylogeny of the Urogenital SystemTextbook: Chapter 11 & 14 |  *Mar 20:*Urogenital System Anatomy Dissection manual: Chapter 9 |
| Week 12Mar 25Mar 27Mar29 | Phylogeny of the Urogenital SystemPhylogeny of the Nervous & Sensory Systems;Textbook: Chapter 14, 16 & 17 | *Mar 27:*Nervous & Sensory System Anatomy Dissection manual: Chapter 10 |
| Week 13Apr 1Apr 3Apr 5 | Phylogeny of the Nervous & Sensory Systems; Course wrap-upTextbook: Chapters 16 & 17 | *Apr 3:***Lab Exam #4** on the internal organ systems |
|  | Final Exam during regular exam period (Apr 8 to 30) |  |

\* Additional readings may be assigned as the course proceeds. These will be noted during the lectures or in the lab manual as appropriate.

**Note:** Optional Lab Exam Review sessions will be arranged for the weekend and Tuesday evening before each lab exam. Specimens from the lab periods will be made available for study purposes during these review sessions.

# Instructors:

# Contact Information:

 Dr Tracy Marchant room 120.3 CSRB wing 306-966-4420

 coordinator tracy.marchant@usask.ca

 Dr Doug Smith room 118 Biology 306-966-4415 lab instructor dh.smith@usask.ca

**Office Hours:** Generally-speaking, the instructors above will be available in their offices on a drop-in basis. However, please note that all instructors have other commitments that may take them away from their office. Specific appointments can be set by email or through a phone call. Email responses to specific questions about course material are at the discretion of each instructor.

## Instructor Profiles & Other Information: Drs Marchant is a regular faculty member/professor in the Department of Biology. She holds advanced degrees (MSc, PhD) and teaches and conducts research in the general area of animal physiology. Dr Smith also hold an advanced degree (PhD) and teaches in diverse subject areas in the Department of Biology including zoology and entomology.

# Required & Supplmentary Resources

## Textbooks

Kardong, K. 2019. *Vertebrates. Comparative Anatomy Function Evolution*. McGraw Hill, 8th ed

Kardong, K & EJ Zalisko. 2019. *Comparative Vertebrate Anatomy – A Laboratory Dissection Guide.* 8th ed. ***This is the only lab manual for the course and must be purchased by each student.***

Both are available from the U of Saskatchewan Bookstore: <http://www.usask.ca/bookstore/>

## Electronic Resources & Recording Devices

Dr. Marchant will also be using the primary literature in her lectures and you may find it useful to consult the original research article. The articles will be available online journals held by the University of Saskatchewan Library. Other useful websites and electronic material will be added to the course Blackboard as appropriate. Recording devices are not permitted during the lectures, except when an accommodation is required as a result of registration with DSS (see below). Digital cameras may be used to photograph specimens used in the laboratory with the provision that such photographs are only shared amongst students in BIOL 361 and are not posted online, except as approved by Dr. Marchant.

## Downloads

These will be available as appropriate through the course Blackboard. You are required to download and read the course syllabus. Supplementary material (for the laboratories in particular) will also be posted on Blackboard for you. This material is designed to provide you with additional explanatory information. The other item that will be posted is a document called “Essential Vertebrate Phylogenies”. You are allowed to bring this document with you to the lab and final exams. Please note that Dr. Marchant’s lecture slides are also provided to you as a courtesy. You are not required to download or print these slides. While she will endeavour to have slides posted sometime in advance of the lectures, this will not be guaranteed. These slides will not replace the lecture or lab experience and you are encouraged to attend all lectures and take your own notes.

## Supplementary Resources

Whenever possible supplementary material will be made available to you through the course Blackboard. A number of paper-based resources for the laboratory may be placed on reserve for you in the Natural Sciences Library; information will be provided to you as appropriate.

Grading Scheme

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| Final Exam | 55 |
| Lab Exams (four) | 45 |
| Total | 100% |

Note that there is no midterm exam for this course.

Evaluation of Student Performance

## Final Exam

Value: 55% of final grade Date: Consult the Final Exam Schedule when it is released.

Length: 3 hours

Format: written answers, in the form of paragraphs or essays.

Description: The exam is comprehensive in that it will cover all lecture material and integrate the anatomy details learned in the laboratory. Students should plan to be in Saskatoon during the final exam period (Apr 8 to 30) as the final exam could be scheduled on any day during this period.

## Lab Exam #1

Value: 8% of final course grade Date: Jan 30 at the beginning of the laboratory period

Length: 1 minute per question/24 questions

Format: spot test utilizing laboratory specimens/material

Description: Will include all of the laboratory material taught to date **except** the Skeletal System.

## Lab Exam #2

Value: 10% of final course grade Date: February 13 at the beginning of the laboratory period

Length: 1 minute per question/30 questions

Format: spot test utilizing laboratory specimens/material

Description: Will include only the laboratory material dealing with the Skeletal System.

## Lab Exam #3

Value: 12% of final course grade Date: March 13 at the beginning of the laboratory period

Length: 1 minute per question/36 questions

Format: spot test utilizing laboratory specimens/material

Description: Will include only the laboratory material dealing with the Muscular System.

## Lab Exam #4

Value: 15% of final course grade Date: April 3 at the beginning of the laboratory period

Length: 1 minute per question/45 questions

Format: spot test utilizing laboratory specimens/material

Description: Will include only the laboratory material dealing with the Internal Organ Systems.

Feedback to Students

Lab exams will be graded and returned by the next laboratory period. Students are advised to use these grades to determine the effectiveness of their study habits. Learning anatomy is like learning a new language. To do well, you must hear it, speak it and read it. All of which takes time, and a good work ethic.

# Missed Lab Exams/Extra Study Time/ Attendance Expectations

Students are expected to attend all scheduled lab periods. It is impossible to schedule make-up labs for this course. A student who does not write a lab exam and lacks a valid reason for missing the exam receive a grade of zero. When possible, specimens will be made available for students to study outside of the regular lab times, usually during the weekend and evenings immediately prior to the lab exam.

# Criteria That Must Be Met to Pass

Students must write the final exam in order to pass the course. Students who do not write the final exam will be assigned a final course grade of 49%, or lower depending on their performance in other aspects of the course, along with a grade comment of INF (Incomplete Failure). The final grade will be adjusted once a deferred final exam is written (see below).

# Lab and Final Examination Scheduling

All examinations must be written on the date scheduled. A student who is unable to write a lab exam through no fault of his or her own (ie for medical, compassionate or other valid reasons) must contact Dr. Marchant as soon as it is clear that the lab exam will be missed. Documentation to substantiate the reason for the absence must be provided. The weighting assigned to the missed exam will be applied to the very next lab exam. Final course examinations may be scheduled at any time during the examination period (April 8 to 30); students should therefore avoid making prior travel, employment, or other commitments for this period.  Students who miss the final exam for a valid reason must contact the College of Arts & Science and apply for a deferred final exam. Deferred exams may utilize a different format than the regular exam, at the sole discretion of Dr. Marchant. Students are encouraged to review all University examination policies and procedures: <http://policies.usask.ca/policies/academic-affairs/academic-courses.php>

# Copyright

All previously-published material used in this course under the fair-use provisions of Canadian copyright legislation or with permission of the copyright holder. The instructors retain copyright of their own work. Students shall refrain from redistributing any material provided to them, except with the permission of the instructors.

# Student Feedback

The Department of Biology or the instructors may survey students regarding the course. This is generally done through an in-class assessment.

# Recording of the Course

Students are not allowed to record the lectures in this course, except with the permission of the instructors or as provided for by arrangements with Access and Equity Services. Any recording made under these provisions are to only be used for the personal learning of the student who made the recording.

# University of Saskatchewan Grading System

 Students are reminded that the University has established a grading system to be used in all of its courses. Information on literal descriptors for grading at the University of Saskatchewan (reproduced below) can be found at: <https://students.usask.ca/academics/grading/grading-system.php>

**Exceptional (90-100)** A superior performance with consistent evidence of

* a comprehensive, incisive grasp of the subject matter;
* an ability to make insightful critical evaluation of the material given;
* an exceptional capacity for original, creative and/or logical thinking;
* an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently.

**Excellent (80-90)** An excellent performance with strong evidence of

* a comprehensive grasp of the subject matter;
* an ability to make sound critical evaluation of the material given;
* a very good capacity for original, creative and/or logical thinking;
* an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently.

**Good (70-79)** A good performance with evidence of

* a substantial knowledge of the subject matter;
* a good understanding of the relevant issues and a good familiarity with the relevant literature and techniques;
* some capacity for original, creative and/or logical thinking;
* a good ability to organize, to analyze and to examine the subject material in a critical and constructive manner.

**Satisfactory (60-69)** A generally satisfactory and intellectually adequate performance with evidence of

* an acceptable basic grasp of the subject material;
* a fair understanding of the relevant issues;
* a general familiarity with the relevant literature and techniques;
* an ability to develop solutions to moderately difficult problems related to the subject material;
* a moderate ability to examine the material in a critical and analytical manner.

**Minimal Pass (50-59)** A barely acceptable performance with evidence of

* a familiarity with the subject material;
* some evidence that analytical skills have been developed;
* some understanding of relevant issues;
* some familiarity with the relevant literature and techniques;
* attempts to solve moderately difficult problems related to the subject material and to examine the material in a critical and analytical manner which are only partially successful.

**Failure <50** An unacceptable performance

# Integrity Defined (from the Office of the University Secretary)

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty.  Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect.  Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary Website and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.  Academic dishonesty is a serious offence and can result in suspension or expulsion from the University. For more information on what academic integrity means for students see the Student Conduct & Appeals section of the University Secretary Website at: <http://www.usask.ca/secretariat/index.php> All students should read and be familiar with the Regulations on Academic Student Misconduct as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals available on the University Secretary Website.

**Student Supports**

**Student Learning Services**

Student Learning Services (SLS) offers assistance to U of S undergrad and graduate students. For information on specific services, please see the SLS web site [https://library.usask.ca/studentlearning/.](https://library.usask.ca/studentlearning/)

**Student and Enrolment Services Division**

The Student and Enrolment Services Division (SESD) focuses on providing developmental and support services and programs to students and the university community. For more information, see the SESD web [site http://teaching.usask.ca/](http://teaching.usask.ca/).

**College Supports**

Students in Arts & Science are encouraged to contact the Undergraduate Student Office and/or the Trish Monture Centre for Success with any questions on how to choose a major; understand program requirements; choose courses; develop strategies to improve grades; understand university policies and procedures; overcome personal barriers; initiate pre-career inquiries; and identify career planning resources. Contact information is available at: [http://artsandscience.usask.ca/undergraduate/advising/](http://artsandscience.usask.ca/undergraduate/advising/%22%20%5Ct%20%22_blank)

**Examinations through Access and Equity Services (AES)**

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with AES if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals. In order to access AES programs and supports, students must follow AES policy and procedures. For more information, check <https://students.usask.ca/health/centres/access-equity-services.php> or contact AES at 966-7273 or aes@usask.ca.

Students who are in need of accommodation for the course must present the appropriate letter from AES to the course coordinator. Students registered with AES may require alternative arrangements for examinations. Students must arrange such accommodations through AES by their stated deadlines.