University of Saskatchewan
Department of Biology

COURSE SYLLABUS

COURSE TITLE:	BIOL 361 Vertebrate Biology		
COURSE CODE:	22577	TERM:	Winter term 2022
COURSE CREDITS:	3.0	DELIVERY:	3L/4P
CLASS SECTION:	01	START DATE:	Jan 5 2022 (lectures) Jan 13 2022 (labs)
LECTURE LOCATION:	ARTS 105	LAB LOCATION:	THORV G11
LECTURE TIME:	M/W/F 11:30 – 12:20	LAB TIME:	Thursdays 1:30 - 5:20 pm
WEBSITE:	via PAWS/Canvas		

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
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 the embryological origin of organ systems within the vertebrate body

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

3. Articulate the language of anatomy, embryology and phylogeny

4. 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

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

6. Work competently and efficiently with other students and the course instructors

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: https://teaching.usask.ca/about/policies/learning-charter.php

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

Land & Treaty Acknowledgement

As we gather here today, we acknowledge that the Saskatoon campus of the University of Saskatchewan is on Treaty Six Territory and the Homeland of the Métis. We pay our respect to the First Nation and Métis ancestors of this place and reaffirm our relationship with one another. We recognize that in the course of your studies you will spend time learning in other traditional territories and Métis homelands. We wish you safe, productive and respectful encounters in these places.

Course Overview

The course consists of 3 hours of face-to-face lectures on the MWF schedule each week and a 4-hour lab for most of the weeks. Generally-speaking, the lectures are designed to illustrate specific aspects relating to the morphology, embryology and phylogenetic relationships that provide the foundation for our current thinking about the evolution of the vertebrate body. Eleven afternoons of hands-on lab exercises also included in this course. In these exercises, you will work in small groups of four or five to perform anatomical dissections 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. 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 are 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.

Attendance at the laboratories is required and make-up labs are not possible in this course. These practical sessions provide learning activities that are essential to the achievement of the learning outcomes of the course. Students will be responsible for some advanced reading prior to attending each laboratory session and for seeking new knowledge during the lab period. Students will work in small groups and will develop teamwork and problem-solving skills by learning from each other and from their instructors. Students will be assigned randomly to groups and each group will be provided with a Group Homepage on Canvas to be used as needed.

Class Schedule

Week **Dates**	**Major Lecture Topics** Textbook reading is underlined*	**Laboratory Activity**
Week 1 Jan 5 & 7	Course Introduction Overview of Deuterostome, Chordate & Vertebrate Phylogeny	*No lab this week*

	Vertebrate Evolutionary Basics: Embryology <u>Textbook:</u> Chapters 1 & 2	
Week 2 Jan 10 to 14	Vertebrate Evolutionary Basics: Embryology Evolutionary Development Highlights <u>Textbook:</u> Chapter 2	Jan 13 Thursday Vertebrate Embryology Basics Introduction to the Chordates
Week 3 Jan 17 to 21	Vertebrate Evolutionary Basics: Patterns of Vertebrate Evolution Through Time. <u>Textbook:</u> Chapters 5 & 13 & 23 (parts) Origins of the Vertebrate Body: The Chordates & Agnathans. <u>Textbook:</u> Chapters 2 & 3	Jan 20 Thursday Comparing Chordate & Agnathan Morphology Anatomy of the Integument
Week 4 Jan 24 to 28	Origins of the Vertebrate Body: The Vertebrate Jaw & Skull <u>Textbook:</u> Chapter 3 & supplementary material	Jan 27 Thursday ***Lab Quiz #1*** Anatomy of the Vertebrate Post-Cranial Skeleton
Week 5 Jan 31 to Feb 4	Origins of the Vertebrate Body: Fins & Limbs <u>Textbook:</u> Chapters 3 & 10	Feb 3 Thursday Anatomy of the Vertebrate Skull & Jaw
Week 6 Feb 7 to 11	Life in Water - Comparing the Chondrichthyan & Osteichthyan Body <u>Textbook:</u> Chapters 6 & 8 (portions of Chapters 7 & 9)	Feb 10 Thursday ***Lab Quiz #2*** Vertebrate Muscular Anatomy
Week 7 Feb 14 to 18	Tetrapods & the Transition to Land <u>Textbook:</u> Chapters 10 & 11	Feb 17 Thursday Vertebrate Muscular Anatomy
Feb 21 to 25	<u>No Lectures – Midterm Break</u>	<u>No Lab – Midterm Break</u>
Week 8 Feb 28 to Mar 4	<u>The Sauropsids</u>	Mar 3 Thursday

	Textbook: Chapter 14, portions of 16-19 & 21	Vertebrate Muscular System Anatomy
Week 9 Mar 7 to 11	The Sauropsids Textbook: Chapter 14, portions of 16-19 & 21	Mar 10 Thursday ***Lab Quiz #3*** Digestive Circulatory & Respiratory System Anatomy
Week 10 Mar 14 to 18	The Sauropsids Textbook: Chapter 14, portions of 16-19 & 21	Mar 17 Thursday Urogenital System Anatomy
Week 11 Mar 21 to 25	The Synapsids Textbook: Chapter 24, portions of 25 & 26	Mar 24 Thursday Nervous & Sensory System Anatomy
Week 12 Mar 28 to Apr 1	The Synapsids Textbook: Chapter 24, portions of 25 & 26	Mar 31 Thursday ***Lab Quiz #4***
Week 13 Apr 4 Monday	Course wrap-up	no laboratory scheduled
	Final Exam during regular exam period (Apr 7 to 28)	

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

Instructors

Contact Information:

Dr Tracy Marchant coordinator	use Canvas messages office: room 120.3 CSRB	306-966-4420
Dr Doug Smith lab instructor	dh.smith@usask.ca office: room G11.7 Thorv	306-966-4415

Communicating With Your Instructors: Your instructors are routinely available by email/Canvas messages or phone. An in-person or Zoom meeting can also be scheduled as needed.

Instructor Profiles & Other Information: Dr 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 Resources

Textbook
Pough F.H. & C.M Janis. 2019. Vertebrate Life 10th edition. Oxford University Press.

Available through the bookstore. **An e-text version is sufficient.**

Additional required readings from the scientific literature will be posted on Canvas at the discretion of the instructor. Summary instructions for the lab will be available each week as a download from Canvas.

Dissection Manuals
Each student must have hard copies of the following dissection manuals:

Smith D.G. & M.P. Schenk. 2019. Dissection Guide & Atlas to the Rabbit, 1st Edition, Morton Publishing Co.

Fishbeck, D. W. & A. Sebastiani. 2015. Comparative Anatomy: Manual of Vertebrate Dissection, 3rd Edition, Morton Publishing Co.

Both dissection manuals are essential to the course. These may be purchased new from the USask bookstore. They may also be available online but ensure that you purchase the correct edition.

Other Materials Needed:
A dissection kit may be purchased through the bookstore if you don't already have one. Safety glasses and a lab coat will also be required (purchase through the bookstore). Lockers are available to rent outside of Room G74 and G77 in the Thorvaldson Building. Disposable gloves will be provided.

Evaluation of Student Performance

Overall Grading Scheme

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

Note that there is no midterm exam for this course.

Final Exam

Value: 55% of final grade
Date: Consult the Final Exam Schedule when it is released.
Length: 3 hours
Format: This will be delivered as an in-person Canvas exam, and will include short answer questions, and those that require 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 7 to 28) as the final exam could be scheduled on any day during this period.

Lab Exam #1

Value: 8% of final course grade
Date: Jan 27 at the beginning of the laboratory period
Length: 1 minute per question/approximately 20 questions
Format: spot test utilizing laboratory specimens/material
Description: Will include all of the laboratory material taught to date

Lab Exam #2

Value: 10% of final course grade
Date: February 10 at the beginning of the laboratory period
Length: 1 minute per question/approximately 30 questions
Format: spot test utilizing laboratory specimens/material
Description: Will include only the laboratory material about 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/approximately 36 questions
Format: spot test utilizing laboratory specimens/material
Description: Will include only the laboratory material about 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/approximately 45 questions
Format: spot test utilizing laboratory specimens/material
Description: Will include only the laboratory material about 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.

Lab Attendance Expectations

Students are expected to attend each lab period and complete the work required of them in the lab manual. It is impossible to schedule make-up labs for this course. Students who miss a lab quiz will be assigned a mark of zero for that lab quiz. Students are required to contact one of the instructors prior to the quiz if they are unable to attend due to illness or extenuating personal circumstances. Documentation to support the reason for the missed quiz must be provided. Marks associated with the missed quiz will be distributed to remaining course components as determined by the instructor. Note that each situation will be judged and determined separately.

Final Examination Scheduling

The final examination must be written on the date scheduled. It may be scheduled at any time during the examination period (Apr 7 to 28); students should therefore avoid making prior travel, employment, or other commitments for this period. Students who miss the final exam 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 the course instructors. Students are encouraged to review all University examination policies and procedures: http://students.usask.ca/academics/exams.php

Recording of the Course

Students are not allowed to record any aspect of 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. For questions about recording and use of sessions in which you have participated, including any concerns related to your privacy, please contact your instructor. More information on class recordings can be found in the Academic Courses Policy: https://policies.usask.ca/policies/academic-affairs/academic-courses.php#5ClassRecordings..

Copyright

Course materials are provided to you based on your registration in the class, and anything created by your professors and instructors is their intellectual property, unless materials are designated as open education resources. Copyright-protected material includes exams, PowerPoint/PDF slides and other course notes. Additionally, other copyright-protected materials created by textbook publishers and authors may be provided to you based on license terms and educational exceptions in the Canadian Copyright Act (see http://laws-lois.justice.gc.ca/eng/acts/C-42/index.html).

Before you copy or distribute others' copyright-protected materials, please ensure that your use of the materials is covered under the University's Fair Dealing Copyright Guidelines available at https://library.usask.ca/copyright/general-information/fair-dealing-guidelines.php. For example, posting others' copyright-protected materials on the open web is not covered under the University's Fair Dealing Copyright Guidelines, and doing so requires permission from the copyright holder.

For more information about copyright, please visit https://library.usask.ca/copyright/index.php where there is information for students available at https://library.usask.ca/copyright/students/rights.php, or contact the University's Copyright Coordinator at mailto:copyright.coordinator@usask.ca or 306-966-8817.

Student Feedback

The Department of Biology or the instructors may survey students regarding the course. This is generally done through an assessment near the end of term.

University of Saskatchewan Grading System

Students in BIOL 361 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:
http://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 (https://academic-integrity.usask.ca/). Academic misconduct is a serious matter and can result in grade penalties, suspension, and expulsion.

Prepare for Integrity

Students are expected to act with academic integrity.

- Students are required to complete the Academic Integrity Tutorial to understand the fundamental values of academic integrity and how to be a responsible scholar and member of the USask community (tutorial link: https://libguides.usask.ca/AcademicIntegrityTutorial) .
- Students can access campus resources that support development of study skills, time and stress management, and ethical writing practices important for maintaining academic integrity and avoiding academic misconduct.

Responses to Misconduct

Students are expected to be familiar with the academic misconduct regulations (https://governance.usask.ca/student-conduct-appeals/academic-misconduct.php#About).

- Definitions appear in Section II of the academic misconduct regulations.
- The academic misconduct regulations apply regardless of type of assessment or presence of supervision during assessment completion.
- Students are advised to ask for clarification as to the specific expectations and rules for assessments in all of their courses.
- Students are urged to avoid any behaviour that could result in suspicions of cheating, plagiarism, misrepresentation of facts. Students should note that posting copyrighted course materials (e.g., notes, questions, assignments or exams) to third party websites or services or other forum or media without permission is an academic or non-academic misconduct offense.

Non-academic offenses are dealt with under the Standard of Student Conduct in NonAcademic Matters and Regulations and Procedures for Resolution of Complaints and Appeals.

Examinations with Access and Equity Services (AES)

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Access and Equity Services (AES) if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals at any time. Those students who are registered with AES with mental health disabilities and who anticipate that they may have responses to certain course materials or topics, should discuss course content with their instructors prior to course add / drop dates. In order to access AES programs and supports, students must follow AES policy and procedures. For more information or advice, visit https://students.usask.ca/health/centres/access-equity-services.php, or contact AES at 306-966-7273 or aes@usask.ca.

Students registered with AES may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through AES by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by AES.

For information on AES services for Fall 2021 please visit:
https://students.usask.ca/health/centres/access-equity-services.php#Fall2021Information

Student Supports

Academic Help for Students

The University Library offers a range of learning and academic support to assist USask undergrad and graduate students. For information on specific services, please see the Learning page on the Library web site https://library.usask.ca/support/learning.php.

Remote learning support information https://students.usask.ca/remote-learning/index.php
Class and study tips https://students.usask.ca/remote-learning/class-and-study-tips.php
Remote learning tutorial https://libguides.usask.ca/remote_learning
Study skills materials for online learning https://libguides.usask.ca/studyskills
A guide on netiquette, principles to guide respectful online learning interactions
https://teaching.usask.ca/remote-teaching/netiquette.php

Teaching, Learning and Student Experience

Teaching, Learning and Student Experience (TLSE) provides developmental and support services and programs to students and the university community. For more information, see the students' web site http://students.usask.ca.

Financial Support

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact Student Central (https://students.usask.ca/student-central.php).

Aboriginal Students' Centre

The Aboriginal Students' Centre (ASC) is dedicated to supporting Aboriginal student academic and personal success. The centre offers personal, social, cultural and some academic supports to Métis, First Nations, and Inuit students. The centre is also dedicated to intercultural education, brining Aboriginal and non-Aboriginal students together to learn from, with and about one another in a respectful, inclusive and safe environment. Students are encouraged to visit the ASC's Facebook page (https://www.facebook.com/aboriginalstudentscentre/) to learn more.

International Student and Study Abroad Centre

The International Student and Study Abroad Centre (ISSAC) supports student success and facilitates international education experiences at USask and abroad. ISSAC is here to assist all international undergraduate, graduate, exchange and English as a Second Language students in their transition to the University of Saskatchewan and to life in Canada. ISSAC offers advising and support on matters that affect international students and their families and on matters related to studying abroad as University of Saskatchewan students. Please visit students.usask.ca for more information.

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:
https://artsandscience.usask.ca/undergraduate/advising/