



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. **Course: ZOOLOGY 377 – THE VERTEBRATES**

Lecture Sections: L01 MWF 08:00-08:50 ENE 243 WINTER 2015
Instructor: Dr. S. Sahney
Course Technician: Mr. W. Fitch BI 037 220-5269 fitch@ucalgary.ca

Course D2L website: ZOOL 377 L01 – (Winter 2015) – The Vertebrates
Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. **PREREQUISITE(S):** Biology 371 or 233 or any two of Biology 231, 241, and 243 completion of at least 9.5 full-course equivalents
See section 3.5.C in the Faculty of Science section of the online Calendar
(<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Midterm lecture test #1	15%
Midterm lecture test #2	15%
Midterm lab test	20%
Graded dissection	5%
Final lab test	20%
Final lecture test	25%

(Both final exams will be scheduled by the Registrar's office.)

Each piece of work completed by the student will be assigned a numerical score (a percentage), and appropriately weighted for that course component (see above). A final aggregate numerical value will be calculated from this and converted to a letter grade that will represent the overall performance in the course. The ranges for the aggregate numerical scores that will equate to each letter grade are as follows: A: 90.0–100%; A-: 85.0–89.9%; B+: 80.0–84.9%; B: 75.0–79.9%; B-: 70.0–74.9%; C+: 65.0–69.9%; C: 60.0–64.9%; C-: 55.0–59.9%; D+: 50.0–54.9%; D: 45.0–49.9%; F: <45.0%. A+ reserved for outstanding performance.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar
5. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours.

Midterm Lab Test – Evening of Friday, March 06, 2015 6:00-9:00 PM BI 044

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

Lecture Midterm 1	Monday, March 2, 2015	In-class
Lecture Midterm 2	Friday, March 27, 2015	In-class

6. **Course Materials: TEXTS:** Required: a) Liem et al. 2001 Functional Anatomy of the Vertebrates, 3rd Edition. Brooks/Cole.
b) Zoology 377 Laboratory Workbook – D2L.

Other Supplies: Dissection kit, surgical gloves, lab coat, protective eyewear are all required.

7. **Examination Policy:** No electronic or written aids (eg. Cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of the exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper. Students should also read the Calendar, [Section G](#), on Examinations.
8. **Writing across the curriculum statement:** e.g. "In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports." See also [Section E.2](#) of the University Calendar.
9. **Human studies statement:** indicating whether students in the course may be expected to participate as subjects or researchers. See also [Section E.5](#) of the University Calendar.

STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS. Students are expected to be familiar with <http://www.ucalgary.ca/pubs/calendar/current/sc-5-1.html> of the on-line calendar.

See also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>.

10. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties.
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: Students with Disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html> [B.1](#) and Student Accessibility Services: <http://www.ucalgary.ca/access/>.
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **Student Union Information:** VP Academic Phone: 220-3911 Email: suvpaca@ucalgary.ca. SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombudsman](#)
- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

Department Approval _____ ORIGINAL SIGNED _____ Date _____

Associate Dean's Approval for
out of regular class-time activity: _____ ORIGINAL SIGNED _____ Date: _____
Z377 co W15; 12/5/2014 10:12 AM

ZOOLOGY 377 – Winter 2015 Lecture/Reading Schedule

Week	Chapters and additional pages	Subject Area	
1.	Jan. 12	Chaps. 1, 2, 3, 130-136	Phylogeny and Diversity
2.	Jan. 19	130-136, 140-142, 184-200, 232-234, Chap. 8	Axial and Appendicular Skeleton
3.	Jan. 26	181-184, Chap. 9	Appendicular Skeleton and Skull
4.	Feb. 02	164-170, Chap. 7	Skull
5.	Feb. 09	Chap 10	Muscular System
6.	Feb. 16	READING WEEK	
7.	Feb. 23	Chap 10; 146-159, Chap. 13	Nervous System
8.	Mar. 02	Midterm Lecture test #1 – Mar. 02	
9.	Mar. 4	473-490, Chap. 12	Nervous System
10.	Mar. 9	131-142, 159-164, Chaps. 16, 17	Digestive System
11.	Mar. 16	Chap. 18	Respiratory Systems
12.	Mar. 23	Chap. 20, 21	U.G. Systems
13.	Mar. 27	Midterm lecture test #2 – Mar. 27	
14.	Mar. 30	Chap. 19	Circulatory Systems
15.	Apr. 06	Chap. 19	Circulatory System
16.	Apr. 13, 15	Chap. 19	Circulatory System

- Please Note:
1. Refer to chapters 1-3, 5, 22, and the Glossary throughout the course.
 2. Follow up points of interest by using the "References" section at the end of each chapter of your textbook.
 3. There will be no lectures on February 17, 19, and 21 (Reading Week).
 4. Lecture materials will be made available on the course website in advance of the corresponding segment of the course.

Beginning Anatomy

“The first and clearly the most important justification for the comparative approach is the desire to know, and more so to understand, the spectrum of variability in the Animal Kingdom. It is intellectually compelling to discover what kinds of structures occur and what the patterns of their distribution are. Basic biological principles can only be recognized as a result of such comparison.....”

Carl Gans, 1969

These laboratories are designed primarily to give you some idea of the range of structure and function of the major organ systems of vertebrates. In order to fully comprehend the implications of variation in structure it is necessary to constantly cross-refer to the text and lecture material and also to make use of specific demonstrations. The demonstrations have been designed to exemplify principles and to fill in the morphological and functional gaps between the cat and the shark.

The laboratory should be the place where you observe the features discussed in lecture and where you develop the comparative approach. **Pay particular attention to function, homology, and developmental patterns.** Also, think of the organisms as if they were alive in their natural surroundings - only then will you be able to fully appreciate the particular structural attributes of a feature.

With respect to the pre-lab Powerpoint slides and the pages designated from the laboratory workbook, it is imperative that you read these before coming to the lab. It is essential that you read all designated pages - teaching assistants will clarify exactly what is to be achieved in each laboratory session at the beginning of the session. Please be in your lab seat with your specimen on the bench by the start of the lab. You will be at a disadvantage if you miss any part of the lab introduction given by the teaching assistant.

ITEMIZED LAB SCHEDULE (2015)

* Everyone must wear safety goggles, gloves, and lab coats during dissection labs

<u>Week</u>	<u>Module(s)</u>	<u>Subject Area</u>
January 12	A, B	<ul style="list-style-type: none"> • Introduction to anatomy laboratory study • Anatomy of the lamprey • Skeleton of the shark
January 19	B	<ul style="list-style-type: none"> • Skeleton of the cat
January 26	B, C	<ul style="list-style-type: none"> • Skeleton of the cat • Musculature of the shark
February 02	C	<ul style="list-style-type: none"> • Musculature of the shark
February 09	C	<ul style="list-style-type: none"> • Musculature of the cat
February 16	C	<ul style="list-style-type: none"> • READING WEEK
February 23	C	<ul style="list-style-type: none"> • Musculature of the cat
March 02	D	<ul style="list-style-type: none"> • Sense organs and nervous system of the shark
March 09	E	<ul style="list-style-type: none"> • Digestive, respiratory, and urogenital systems of the shark
March 16	E	<ul style="list-style-type: none"> • Digestive, respiratory, and urogenital systems of the cat
March 23	F	<ul style="list-style-type: none"> • Circulation of the shark
March 30	F	<ul style="list-style-type: none"> • Circulation of the cat
April 06	F	<ul style="list-style-type: none"> • Circulation of the cat

MID-TERM LAB EXAM

Evening of Friday March 06, 2015. The Mid-term lab exam will cover modules A, B, and C.

FINAL LAB EXAM

Exam to be scheduled by Registrar. The lab final will cover Modules D, E, and F, and will build upon information carried over from Modules A, B, and C.

Lab Introduction

Laboratory work is a vitally important portion of this course. With the experience you will have gained in the analysis and recognition of anatomical form, you should at the end of the course be competent (with the aid of manuals or anatomical papers) to explore and comprehend the anatomy of any vertebrate. If you have learned that much, you will have gained from the course. It is not our intention, nor is it in our power, to teach you all the anatomy of all kinds of vertebrates; it is designed only to provide you with a basis for understanding vertebrate anatomy as you encounter it.

In order to accomplish this objective, however, it is necessary that you be at all times comparison-minded. The extent of the differences will on occasion baffle you, and you will demand an intermediate type to help you bridge the apparent gaps.

We will attempt to bridge these gaps for you in three ways:

1. by demonstrations of intermediate conditions in selected forms
2. by requiring you to read in parallel with your lab work the pertinent sections of the lecture text
3. by keeping the lecture portion of the course as far as possible in step with the lab

Plan of Work

The technique we have adopted for guiding you through the anatomies of the cat and the shark is that of "verification". The laboratory workbook describes or pictures for you the morphology of these animals. We expect you to ascertain for yourself the accuracy of these pictures and descriptions and to acquaint yourself with the actual structures in such a manner that you will be able to recognize them when you see them again.

Organize your time so as to complete the assigned work during the designated lab period. **You must prepare for each lab period by reading the on line pre-lab material and the relevant workbook module before you arrive in the lab.** You are urged to outline, prepare an abstract, underline, or prepare the portions of your workbook in any way that will facilitate your work during the brief lab period. Please note that the pages assigned delimit the "required" lab work, but realize that additional reading will prove helpful. For the cat you will be working in pairs - for maximum benefit you must both contribute equally to the effort.

General Comments

1. There will be no smoking, eating or drinking in the laboratories.
2. The lab operates on an "open-ended" system. You must always come to your scheduled laboratory period but, from past experience, you will probably need to come back during the week at some time to review your dissection. This you may do at any time during the normal working day (if the lab is locked please ask the museum technician to open it).

During regular lab hours those students scheduled at that time have priority on space and equipment and you must wait until they have all of their requirements before getting yourself organized. **IT IS IMPERATIVE THAT YOU KEEP THE LABORATORIES TIDY - WORKING PRIVILEGES OUTSIDE SCHEDULED LABORATORY HOURS WILL BE WITHDRAWN IF THE LABORATORIES BECOME INORDINATELY UNTIDY.**

3. **You must provide yourself with a dissecting kit** and must realize that poor quality or poorly maintained instruments will result in poor dissections. Learn not to be afraid of touching the specimens and come quickly to the realization that your fingers are some of the best and most sensitive dissection instruments available. You must also provide your own eye protection.
4. **Get to know your lab TA and ask questions frequently.** Questions such as "Can you find 'x' for me?" will not be accommodated. The TAs are there to give you help and instruction and to clarify points but are not there to do all of the manual work for you. **Learn early to correlate the lectures and labs.** The lecture material only becomes meaningful when you have seen the real thing. Use the demonstrations as a bridge between the practical experiences of the laboratory and the theoretical approaches of the lecture.

SUMMARY

1. Labs missed because of illness must be made up by appointment with the Teaching Assistant. It is possible to attend a lab later in the week.
2. Specimens are not to be removed from the lab.
3. Each student is responsible for their own dissection material, work area, and demonstration material.
 - a) Dissection specimens must be labelled with your name and section, kept in good condition, and stored in the proper storage facility.
 - b) Work areas must be cleared, dissecting trays washed, and waste disposed of properly at the end of each period.
 - c) Demonstration material and other teaching material must be returned to the appropriate location at the end of each lab period.
4. There will be one shark per person and one cat between two students. Each student is responsible for examining both sexes of the animals being studied. We strongly advise you to examine multiple dissections (with permission) in order to get a feeling for anatomical variation.