

**ZOOL 3150**  
Dr. Jeffery Scales  
N 262

**Comparative Anatomy of Vertebrates**  
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**Spring 2019**  
209.667.3480  
Wed. 1-3 pm

### ***Course Description***

Comparative Anatomy of Vertebrates is an introduction to the anatomy of vertebrates, with an emphasis on functional and evolutionary relationships. In this course, we will be linking the structure and function of anatomical systems while examining the evolution of these systems across vertebrates. We will cover the skeletal, muscular, respiratory, circulatory, digestive, nervous, and urogenital systems. This course is designed for undergraduate biology majors with a strong foundation in basic biology (BIOL 1050 and BIOL 1150 are prerequisites for this course). The lecture and lab are combined into a single grade. Only letter grades are available for this course (no CR/NC).

### ***Course Objectives***

The objective of this course is to familiarize students with the basics of vertebrate anatomy, diversity, and evolution. At the completion of this course students will:

- Have a strong understanding of general vertebrate anatomy.
- Understand the organization of the vertebrate body/organs from fishes to mammals.
- Understand the relationships between anatomical structures and their function.
- Have a broader understanding of the evolution and diversity of vertebrates.
- Develop improved critical thinking skills so they can apply their knowledge of anatomy to novel situations.
- Develop improved communication skills with the precise use of biological terminology.
- Have the laboratory/dissection skills necessary for anatomical study.

### ***Required Texts/Materials***

- Kardong, KV. Vertebrates: Comparative Anatomy, Function, Evolution, McGraw-Hill (7<sup>th</sup> or 8<sup>th</sup> edition is fine)
- Kardong, KV and Zalisko, EJ. 2015. Comparative Vertebrate Anatomy: A Laboratory Dissection Guide, 7<sup>th</sup> ed. McGraw-Hill.
- Instructors Dissection Kit. NascoWest.
- Gloves (nitrile, rather than latex, gloves are recommended)

### ***Optional Texts/Materials***

- Borror, DJ. 1988. Dictionary of Word Roots and Combining Forms. (Available on the course Blackboard site)
- Lab coat (or old shirt)

### ***Course Information***

Information for this course (syllabus, lecture slides, etc.) can be found on Blackboard ([blackboard.csustan.edu](http://blackboard.csustan.edu)). Communication regarding the course will be done via Blackboard or email. Thus, it is the student's responsibility to check the course Blackboard page and your university email regularly. If you need to contact me, please use email rather than telephone (I don't check my phone messages very often). Please include your name and the course name/number in the subject line for all emails.

### ***Lecture/Laboratories***

Lectures will begin promptly at the start of class time. Because the anatomy of vertebrates is a broad and diverse topic, we will cover a large amount of material in a short time. Thus, students should be prepared to regularly attend lecture, arrive on time, take notes, and read the accompanying material in the text book. Lecture slides will be posted to Blackboard (but lecture notes will not). If you feel that I am covering material too fast, please ask me to slow down or repeat the material. In fact, I strongly encourage students to ask any questions related to the material being presented.

The laboratory will cover anatomical structures through observation and dissection. This requires students to actively participate in dissection during lab times, including the use, manipulation and dissection of preserved animals and their organs. By remaining enrolled in this course, a student agrees to participate in experiments using preserved animals and organs.

**Students are expected to act in a mature and respectful manner toward the professor and other students at all times during both lab and lecture** (see Academic/Personal Integrity below). Students should arrive on time to class, turn off their cell phones, and refrain from talking during lecture/lab, interrupting students asking questions, or being disruptive in any manner. Students who are disruptive will be asked to leave. The use of audio and/or video recorders or cameras (including cell phone cameras) is **not** permitted during lecture. An exception is made for students who are registered with Disability Resource Services and approved for this accommodation (see below). If you do not comply with this policy, you will be removed from this course.

### ***Lab Safety***

Each student must watch the tutorial on the BioLab Safety course on Blackboard and pass the quiz with 100% correct. Failure to do so by the end of the second week of class will result in removal from the course.

### ***Open Lab***

The anatomy lab (N224) will often be open for study/review on Wednesdays from 9:00-3:00pm and Fridays from 9:00 -3:00pm (see Course Schedule). It is highly recommended that you make use of this time. Open labs will not be available on days when lab exams are scheduled (for any course). Any inappropriate use of the lab or destruction/loss of lab materials during open lab will result in the loss of this privilege for the remainder of the semester for all students.

### ***Attendance***

Attendance will be taken throughout this course. Regular attendance in lecture is essential to your learning and success in this course. You are expected to attend every class, arrive on time, and stay until the end of the lecture or lab period. Attendance involves both your physical presence and your attention and participation. If an absence is unavoidable, it is the student's responsibility to notify the professor as soon as possible. If a student is absent, the student (not the instructor) is responsible for all information and material missed. Poor attendance or disruptive behavior will be taken into consideration when grading. Attendance for all laboratories is mandatory.

### ***Exams & Quizzes***

All lecture and lab exams/quizzes are designed with the course objectives in mind. **Spelling, grammar, sentence structure, and good penmanship all count in the grading of exams/quizzes.** After exams/quizzes have been returned, students have one week to dispute scores; no scores will be changed after that time. Exam/quiz scores will be posted on Blackboard after they are graded. It is best to start studying early and often for exams so that you retain the information. Don't put off reviewing for exams!

### ***Lecture Exams (230 points)***

There will be three lecture exams (50 points each) and a final exam covering both new and cumulative material (80 points). Lecture exams will focus on material covered in lecture. Exams will begin promptly at the start of class (late arrivals will not be given extra time), and no exams will be handed out after the first student has finished the test. Exam question formats may include multiple-choice, short answer, short essay, or other forms of questions. As stated above, poor spelling/grammar errors or illegible handwriting will result in a loss of points

Make up exams are only allowed in extreme cases (family vacations or work **do not** qualify as extreme cases)! In cases of severe illness or family emergency (e.g. death in the immediate family) appropriate verification will be required and a make-up exam must be taken within one week of the original date of the exam. If your absence during an exam is not excused, your score on the exam will be zero. Students should arrange their schedules to accommodate exam/quiz dates!

Class activities/Homework (40 points, and a 25 point presentation)

There will be regular in-class activities and homework assignments given throughout the semester. These will be announced and provided in class only. They may include critical thinking questions, discussion, and reading/interpreting primary literature. There will also be a **10-15 minute presentation** (25 points) on an assigned topic related to the comparative anatomy of vertebrates. These presentations will be graded according to rubrics handed out in class at the time of the presentation.

***The instructor reserves the right to add or remove assignments, exams, or quizzes as he sees fit for the course.***

Lab Practical Exams & Quizzes (260 points)

There will be two lab practical exams (100 points each) and quizzes at the end of each lab period (5 points each). Lab exams/quizzes will be in a timed format and will focus on identification, function, and evolutionary relationships. Because lab practical exams/quizzes are very time-consuming and difficult to set up, **NO** make-up lab exams will be given, so make sure you arrange your schedule accordingly! Lab quizzes will only be given during regular lab times.

Participation (20 points)

Participation in lab is critical for your success in this course. Participation points will be based on your active engagement in lab and dissection, including active contribution in dissection, progression/quality of dissections, attendance, professional behavior, and maintenance/cleanliness of your lab space and the lab in general. Seventy five percent of this grade will be determined by the instructor, while 25% will be determined by your lab partner. Participation grades are **not** negotiable.

***Evaluation/Grading***

Your grade will be earned based on your performance in both lecture and lab. Scores will be posted on Blackboard only (no scores will be provided via email or phone). After the end of the term, you may access your grade from <http://my.csustan.edu>. Students should keep track of their scores (including all graded materials) for the duration of the course. Dissection is a necessary component to the lab. Students who do not actively participate in dissection **will receive a failing grade for the course regardless of their scores.** A total of 575 points are available. Letter grades will be assigned based on a percentage of total points earned as follows:

A	≥ 90%
B	≥ 75%
C	≥ 60%
D	≥ 50%
F	≤ 50%
WU	≤ 50% and one or more unexcused exam absence.

\* Total points available may change if homework/quizzes are added/removed, but grades will still be based on the same percentage of total points earned.

The use of +/- grades is at the instructor's discretion. Only letter grades can be earned (CR/NC is not available for this course). No extra credit will be available in this course! Once assigned, grades will not be changed unless an error in grade calculation has occurred.

### ***Course Drop and Withdrawal Policy***

The policies for this course follow the university policies. Adding or dropping courses after the Enrollment Census Date (21 February) will not be allowed. After the Enrollment Census Date, students are responsible for completion of the course. After the Enrollment Census Date and prior to the last twenty percent of instruction, withdrawals may be allowed only for extreme circumstances (academic difficulties do not count). Withdrawals must be approved by the instructor, department chair, dean of the College of Science, and Student Affairs for approval.

### ***Reasonable Accommodation for Disabilities***

Students with documented disabilities which may impact their performance in this course should contact the Disability Resource Services (DRS) office. The DRS staff will determine the appropriate accommodations for this course. Students with disabilities should also make an appointment with the instructor to discuss the approved accommodations. All information and documentation regarding disabilities is confidential. DRS students still must take all exams on the scheduled exam day.

### ***Academic/Personal Integrity***

There is zero tolerance for academic dishonesty in this course. Academic dishonesty includes, but is not limited to cheating, plagiarism, or inappropriate use of course materials. Students violating this policy will receive a failing grade for the course and be referred to the Student Judicial Affairs Office. Furthermore, students exhibiting any behavior that is not consistent with the Student Conduct Code will be removed from the course and receive a failing grade. This includes any behavior that interferes with course instruction and/or the ability of other students to learn. Please see the University Code of Conduct for more information:

<http://www.csustan.edu/judicial-affairs/student-responsibilities>

Misuse of lab materials will result in grades being withheld until the department has been compensated for damaged materials.

### ***Implied Contract***

This syllabus serves as a contract between you and the instructor. By remaining enrolled in this course, you acknowledge that you have read, understand, and agree to the material and policies herein.

### **Tips for Success:**

1. **Devote time to this course-** Anatomy is a challenging subject. In order to succeed in this course, you will need to commit a significant amount of outside time for studying. For example, if you spend three hours in lab a week, you should expect to spend at least three hours outside of lab studying the material. Cramming does not work for this amount of material. Review Frequently!
2. **Don't skip lecture and participate in class-** Successful students always attend class, but just being there is only part of success. You must play an active role in your education. Read material before class so that the lecture content is already familiar to you. Taking lots of notes will help you pay attention in class and reading, hearing, and writing content will all improve your comprehension. Review your notes after class and rewrite or add to them if needed.
3. **Don't Fall Behind!** – This course covers a large amount of material and each lecture/chapter builds on one another. Because of the pace of this course it will be very difficult to catch up if you fall behind. Keep up with the readings, lectures, and homework and you will be able to

understand, retain, and enjoy the information much more. Only you are responsible for your education, so put in the time and learn the material!

4. **Ask Questions (take advantage of your instructors)** – If you don't understand a concept, ask a question! If you don't understand something, it's more than likely that other students have the same question(s), so don't hesitate to ask me a question in class or come to my office hours for help. Fellow students and tutoring can also be invaluable resources as well.
5. **Interact with other students in the course**– Studying with others is often an effective way to learn material for many people. Form study groups (even just pairs) to talk through ideas. Explain concepts to each other (teaching is one of the best ways to learn something) and challenge each other's ideas. Working/talking through problems with another person, like your lab partner, can be a very effective learning tool.
6. **Discover your learning and study styles** – Students learn in different manners and at different rates. Try different learning and study strategies. People can learn visually, aurally, through reading/writing, or even socially. Try different styles and see what works for you. Find study habits that work for you as well. How, where, when, how long, and with whom you study can all influence your leaning/retention. If you are unhappy with your performance in a course, do not expect your grades to change if you do not change your study habits/strategy.

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COURSE SCHEDULE\*

Date	Lecture Topic	Date	Lab Topic/Chapter(s)
29 Jan	Introduction, phylogenetics	25 Jan	No lab
31 Jan	Phylogenetics and relationships	30 Jan	Open lab
05 Feb	Evolution of chordates	32Feb	Terminology, protochordates, agnathans
07 Feb	Cells, tissues, organs, systems, organisms	06 Feb	Open lab
12 Feb	Vertebrate development, Cranial Skeleton	07 Feb	Skeleton
14 Feb	<b>Exam 1</b>	13 Feb	Open lab
19 Feb	Axial Skeleton	14 Feb	Skeleton
21 Feb	Appendicular Skeleton	20 Feb	Open lab
26 Feb	Muscular system	21 Feb	Muscles
28 Feb	Muscular system	27 Feb	Open lab
05 Mar	Function: Joints, Levers, Locomotion/Feeding	28 Feb	Muscles
07 Mar	Respiratory system	06 Mar	Open lab
12 Mar	Respiratory System	07 Mar	Muscles
14 Mar	Respiratory System	13 Mar	Open lab
19 Mar	No class (Spring Break)	14 Mar	<b>Lab Practical 1/Respiratory &amp; circulatory</b>
21 Mar	No class (Spring Break)	20 Mar	No lab
26 Mar	Circulatory System	21 Mar	No lab
28 Mar	<b>Exam 2</b>	27 Mar	Open lab
02 Apr	Circulatory System	28 Mar	Respiratory/circulatory
04 Apr	Circulatory System	03 Apr	Open lab
09 Apr	Digestive System	04 Apr	Respiratory/circulatory
11 Apr	Digestive System	10 Apr	Open lab
16 Apr	Nervous System	11 Apr	Digestive system
18 Apr	Nervous System	17 Apr	Open lab
23 Apr	Sensory organs	18 Apr	Nervous System
25 Apr	Excretory System	24 Apr	Open lab
30 Apr	<b>Exam 3</b>	25 Apr	Nervous System
02 May	Reproductive System	01 May	Open lab
07 May	Evolution	02 May	Urogenital System
09 May	Presentations	08 May	Open lab
14 May	Conclusions & Review	09 May	<b>Lab Practical 2</b>
21 May	Final Exam (8:30-10:30 am)	16 May	No lab

\*Note that the lecture schedule is tentative and will likely change, but will follow the same sequence. However, the lab schedule and exam/practical dates will not change.