

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

**Comparative Anatomy of Vertebrates**  
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**Spring 2017**  
209.667.3480  
Tues. 3-4 pm ,Wed. 10-11 am

### ***Course Description***

Comparative Anatomy of Vertebrates covers the anatomy of vertebrates, with an emphasis on functional, comparative, and evolutionary relationships. This course combines a functional approach, linking the function and evolution of vertebrate organ systems, with a “systemic” approach covering the major anatomical systems including skeletal, muscular, respiratory, circulatory, digestive, and nervous systems. This course is designed for undergraduate biology majors with a sound background in basic biology so 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 as well as the diversity of vertebrates. At the completion of this course students will:

- Have a strong understanding of the general anatomy of vertebrates.
- 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. 2015. Vertebrates: Comparative Anatomy, Function, Evolution, McGraw-Hill
- 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 the course (syllabus, lecture slides, etc.) can be found on Blackboard (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 or 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. I also 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 8:00-3:00 (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 will be 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 (250 points)***

There will be three lecture exams (50 points each) and a final exam covering both new and cumulative material (100 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!

### Lab Practical Exams & Quizzes (300 points)

There will be two lab practical exams (100 points each) and two lab quizzes (50 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!

### **Assignments** (90 points)

There will be three assignments given throughout the semester. 1) A **group lecture summary** (20 points). An **article summary and discussion** (30 points) which will be a 1 page summary of a primary scientific article read and discussed in class. 2) A **10-20 minute presentation** (40 points) on an assigned topic related to the comparative anatomy of vertebrates. Each of these assignments will be graded according to rubrics handed out in class at the time of the assignment.

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

### **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 660 points are available. Letter grades will be assigned based on a percentage of total points earned as follows:

|    |   |
|----|---|
| A  | ≥ 85%   |
| B  | ≥ 75%   |
| C  | ≥ 60%   |
| D  | ≥ 50%   |
| F  | ≤ 50%   |
| WU | ≤ 50% and one or more unexcused exam absence. |

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.

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

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

The policies for this course follow the university policies. Adding or dropping courses after the Enrollment Census Date (22 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.
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 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 learn the material!

4. **Ask Questions** – 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. **Work in groups**- 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.

## COURSE SCHEDULE\*

| Date   | Lecture Topic                           | Date   | Lab Topic/Chapter(s)                                 |
|--------|---|--------|--|
| 26 Jan | Introduction, Chordates and vertebrates | 26 Jan | No lab   |
| 31 Jan | Chordates and vertebrates               | 27 Jan | Terminology, non-vertebrates, tissues                |
| 02 Feb | Tissues, Integument                     | 02Feb  | Open lab   |
| 07 Feb | Integument                              | 07 Feb | Skeleton   |
| 09 Feb | Skeleton                                | 09 Feb | Open lab   |
| 14 Feb | Skeleton                                | 16 Feb | Skeleton   |
| 16 Feb | Skeleton                                | 17 Feb | Open lab   |
| 21 Feb | <b>Exam 1</b>                           | 23 Feb | Muscles ( <b>Lab Quiz 1</b> )                        |
| 23 Feb | Muscular system                         | 24 Feb | Open lab   |
| 28 Feb | Muscular system                         | 28 Feb | Muscles  |
| 02 Mar | Muscular system                         | 01 Mar | Open lab   |
| 07 Mar | Respiratory system                      | 09 Mar | Muscles  |
| 09 Mar | Respiratory System                      | 10 Mar | Open lab   |
| 14 Mar | Respiratory System                      | 16 Mar | <b>Lab Practical 1/Respiratory &amp; circulatory</b> |
| 16 Mar | Circulatory System                      | 17 Mar | Open lab   |
| 21 Mar | No class (Spring Break)                 | 23 Mar | No lab   |
| 23 Mar | No class (Spring Break)                 | 24 Mar | No lab   |
| 28 Mar | Circulatory System                      | 30 Mar | Respiratory/circulatory                              |
| 30 Mar | <b>Exam 2</b>                           | 31 Mar | Open lab   |
| 04 Apr | Circulatory System                      | 06 Apr | Digestive system                                     |
| 06 Apr | Digestive System                        | 07 Apr | Open lab   |
| 11 Apr | Digestive System                        | 13 Apr | Nervous system ( <b>Lab Quiz 2</b> )                 |
| 13 Apr | Digestive System                        | 14 Apr | Open lab   |
| 18 Apr | Nervous System                          | 20 Apr | Nervous System                                       |
| 20 Apr | Nervous System                          | 21 Apr | Open lab   |
| 25 Apr | Nervous system, sensory organs          | 27 Apr | Urogenital System                                    |
| 27 Apr | Sensory organs                          | 28 Apr | Open lab   |
| 02 May | <b>Exam 3</b>                           | 04 May | Urogenital System                                    |
| 04 May | Urogenital System                       | 05 May | Open lab   |
| 09 May | Urogenital System                       | 11 May | <b>Lab Practical 2</b>                               |
| 11 May | Urogenital System                       | 12 May | Open lab   |
| 16 May | Conclusions                             | 18 May | No lab   |
| 23 May | Final Exam (8:30-10:30 am)              |        |  |

\*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.