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COURSE OBJECTIVES

ZOOL 3150 is a comprehensive course on anatomy and morphology of vertebrates. Morphology is a biological discipline and not a static list of terminology; anatomy is only truly understood within the evolutionary, developmental, and functional contexts. We will focus on four broad questions:

- What are components of the major anatomical systems in vertebrates?
- What are the functions of these anatomical structures?
- How do structure and function complement one another?
- What is the evolutionary history of these systems?

Based on these, you should be able to apply what you have learned to unknown vertebrate systems and use that knowledge to make predictions and reasoned reconstruction of 600 million years of vertebrate natural history.

As a result, by the end of the course successful students will:

- Understand the organization of the vertebrate body, the major features and interrelationships of the organ systems, and the relationship of structure and function
- Visualize the internal anatomy and to relate this to surface features
- Understand the nature of science and to the biological significance of animal structure
- Develop your care in verbal expression (including the precise use of English as well as of scientific terminology) and habits of logical and critical thinking

There is a substantial amount of information to be mastered in this course. To do well, one must devote the necessary time and effort. Experience indicates that to be successful, for every hour in class (lecture and/or lab) a minimum of two hours of preparation and/or review are needed outside of class. Each lecture and lab is organized with the assumption that you have read the assigned material prior to class.

Education is not mere memorization and regurgitation—it is learning how to learn, understanding what you have learned, and being able to communicate what you have learned. While some memorization is necessary, your focus should be on understanding and communication of that understanding. To communicate we must be able to convey meanings as precisely as possible; this is the function of language. Misuse of words limits understanding, betrays a lack of understanding in a speaker, and undermines the reputation of someone who presents themselves as an educated person.

Anatomy is the basis of improved zoology. The classification of animals is founded upon their organization. This can be ascertained only by dissection. The use of the knife is recommended for the purpose of acquiring an acquaintance with the structure of animals. It is proposed that the members avail themselves of all opportunities to cultivate COMPARATIVE ANATOMY, and to communicate the results of their labors and researches to society.

—Samuel L. Mitchill MD, LLD

REQUIRED TEXTS/MATERIALS

- Kardong, KV. 2012. *Vertebrates: Comparative Anatomy, Function, Evolution, 6th ed.* McGraw-Hill
- Kardong, KV and Zalisko, EJ. 2012. *Comparative Vertebrate Anatomy: A Laboratory Dissection Guide, 6th ed.* McGraw-Hill.
- Shubin, N. 2008. *Your Inner Fish.* Pantheon.
- Instructors Dissection kit. Nasco.
- Gloves (nitrile)

OPTIONAL TEXTS/MATERIALS

- Borror, DJ. 1988. *Dictionary of Word Roots and Combining Forms.* McGraw-Hill.
- Lab coat (or old shirt)

COURSE INFORMATION

Information for the course (syllabus, scores, calendar, supplemental materials, etc.) can be found on the course’s Moodle page (<http://moodle.csustan.edu>). You must register for the page to access it. To register for Moodle, click the link for the appropriate course (**ZOOL 3150: Comparative Anatomy of Vertebrates**) and create a new account (or you may use a previously created account). Enter the enrollment key for the course: **zool31502132**. Once enrolled, go to

Profile Settings > Edit Profile. Make sure that the information there is accurate (e.g., your full name has been entered, your email address is correct). At the bottom of the page enter your student identification number. *Failure to correctly register for the Moodle page by 22 February will result in disenrollment from the course.*

If you need to contact me, it is best to do so by email or through the Moodle page. Please include your name and the course number in the subject line.

EXAMS AND QUIZZES

Exams are written with the above-listed course objectives in mind. The information in this course cannot be divided into separate, discreet units, therefore, all exams will, to some extent, be cumulative. Exam questions are very carefully written, in technical and standard English. Your answers must be clear, thoughtful, and appropriate to the question asked. Exams will begin promptly at the designated time; late arrivals will not be given extra time. No exams will be handed out after the first person has finished. Correct spelling, grammar, and penmanship are necessary for effective communication. Therefore, spelling and/or grammatical errors will result in loss of points on exams; illegible and/or incoherent answers will receive no credit.

Lecture exams will not include specific questions from dissection, but lectures, commentaries presented in lab, the lab manual, and any other supplemental materials are all good sources of possible questions. Exam questions rarely come directly from the text, but it is unwise to ignore it. Exam questions may include almost any format and may include a take-home component. The final exam will include new and cumulative material.

In all affairs it's a healthy thing now and then to hang a question mark on the things you have long taken for granted.

—Bertrand Russell

Lab exams will be in a timed, practical format and will focus on identification and understanding of relationships and function. Anything included in the lab manual or lecture is fair game. As a way of testing your understanding, lab exams may include “unknowns” (i.e., materials that you have not seen in class).

Don't put off reviewing for exams, but start well before the deadlines approach—it is best to start studying for the first exam and on the first day of class. Review after each class; review everyday including weekends and you will learn more easily, and, as a result, you will be more confident and do better on exams. See the Course Schedule for exam dates.

Quizzes may be given at anytime during lecture or lab.

Additional information regarding successful learning is available on the course Moodle page. Print these pages, read them, and put them in your notebook so that you can review them throughout the term.

SUPPLEMENTAL READING

In addition to the text book and lab manual, there will be assigned supplemental readings. Shubin's *Your Inner Fish* is a book that we will be reading throughout the term (as listed on the course schedule). I will also post other readings on the Moodle page. We will take time occasionally to discuss these readings. Exam (or quiz) questions may come from any of these readings.

INDEPENDENT RESEARCH PROJECTS

Students will complete an independent research project and present the results in the form of a scientific poster at the end of the semester. The introduction and associated literature cited section will be due earlier in the semester. More information is available in the course Moodle page. Start thinking about your project early in the semester.

ATTENDANCE

Regular attendance is vital to your success in this course. Make up exams will not be given. Missing exams will be averaged out of your grade *if* the absence is excused. Absences will only be excused with valid documentation. Non-emergency appointments are not acceptable reasons for absenteeism. Only one lecture exam or lab practical may be averaged out. Absences during the final exam or poster presentation will result in a failing (F) grade.

GRADING

CR/NC grades are not approved by the University for this course. Grades are determined by the points you earn during the course. Points are awarded for your ability to communicate your knowledge and understanding of the material in this course. The performance of your classmates will have no impact on your grade. Your course grade will be determined by your combined performance on exams, practicals, and the research project. Course grades will be determined as follows: A ≥ 85%, B ≥ 75%, C ≥ 65%, and D ≥ 55%.

Scores will not be curved or otherwise adjusted and there will be no other possible points available beyond those mentioned herein. The use of +/- grades is at my discretion.

Scores will be posted on the course Moodle page. It is expected that students will keep track of their scores (including copies of exams, assignments, etc.) for the duration of the term. Because of potential privacy issues, scores and/or grades will not be given out *via* e-mail or phone. After the end of the term, students may access their course grades at *my.csustan.edu*.

RECORDING POLICY

The use of audio and/or video recorders or cameras is not permitted during lecture or lab. An exception is made for students who are registered with Disability Resource Services and approved for this accommodation. If you do not intend to comply with this policy, please enroll in another class.

PERSONAL INTEGRITY

It is expected that students will conduct themselves responsibly and will treat instructors, their fellow students, the facilities, and materials with courtesy and respect. This includes, but is not limited to, being on time, not being disruptive in class. Electronic devices may be used for educational purposes, but web-surfing, checking email, etc. are prohibited during class. It is assumed that you have read and understand the university's position on academic integrity and student discipline as stated in the University Catalog and Student Handbook. Behavior that is not consistent with the Student Conduct Code—including any form of academic dishonesty—will result in immediate expulsion from the course, a failing grade, and the matter will be referred to the Office of Student Judicial Affairs.

STUDENTS WITH DISABILITIES

Students with documented disabilities need to make an appointment with me as soon as possible to discuss course adaptations and/or accommodations. If you have an undocumented disability, contact Student Support Services.

OPEN LAB

The anatomy lab (N224) will generally be available for study/review on Fridays from 8:00-4:00. It is highly recommended that you make use of this time. However, inappropriate use of the lab or destruction/loss of lab materials during open lab will result in cancellation of this privilege for the duration of the term for all students.

COURSE DROP AND WITHDRAWAL POLICY

The policies for this course are the same as 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(s) in which they are enrolled." Withdrawal from courses after the Enrollment Census Date may be allowed "for documented extreme circumstances beyond the student's control". Illness and similar catastrophes may qualify; academic difficulties do not. Withdrawal from the course must be approved by the instructor, the chair of the Department of Biological Sciences, and the dean of the College of Science before being submitted to Student Affairs for final approval.

COURSE INFORMATION

The syllabus, lecture schedules, lab schedules, as well as any relevant announcements or other information will be posted on the course Moodle page. Communication regarding the course will be done *via* the course page or email; it is your responsibility to check the course page and your university email regularly.

IMPLIED CONTRACT

This syllabus serves as a contract between you and the instructor. Your continued enrollment in this class implies your understanding of and agreement with the material in the syllabus. Print this syllabus, read it carefully, and keep it in your notebook to reference throughout the term.

COURSE SCHEDULE[†]

Date	Lecture Topic	Text*	Shubin	Date	Lab Topic	Manual
29 Jan	Introduction	Ch. 1	Ch. 1	31 Jan	Terminology; non-vertebrates and lamprey	Ch. 1-3
31 Jan						
05 Feb	Chordates and Vertebrates	Ch. 2-3	Ch. 2	07 Feb	Integument	Ch. 4
07 Feb						
12 Feb						
14 Feb	Vertebrate Design and Life History	Ch. 4-5	Ch. 3	14 Feb	Skeleton	Ch 5
19 Feb						
21 Feb						
26 Feb	Integument	Ch. 6		28 Feb	Muscles	Ch. 6
28 Feb	Exam 1					
05 Mar	Skeleton	Ch. 7-9	Ch. 4	07 Mar		
07 Mar						
12 Mar				Ch. 5	Practical 1	
14 Mar						
19 Mar	Muscles	Ch. 10	Ch. 6	21 Mar	Digestive	Ch. 7
21 Mar						
26 Mar						
28 Mar	Respiratory	Ch. 11	Ch. 7	28 Mar	Circulatory and Respiratory	Ch. 8
09 Apr						
11 Apr	Exam 2			12 Apr		
16 Apr	Circulatory	Ch. 12	Ch. 8	18 Apr	Urogenital	Ch. 9
18 Apr						
23 Apr	Digestive	Ch. 13	Ch. 9	26 Apr	Nervous	Ch. 10
26 Apr						
30 Apr	Urogenital	Ch. 14	Ch. 10	02 May		
02 May						
07 May	Endocrine	Ch. 15	Ch. 11	09 May	Practical 2	
09 May	Nervous	Ch. 16, 17		16 May	Poster Presentation	
14 May						
16 May	Conclusions	18				
23 May	Final Exam (11:15-1:15)					

† The lecture schedule is tentative and will likely change. However, exam dates will not change.

* These are suggested pages for the topic; there may be other pages in the text that are applicable. It is recommended that you make use of the texts' Table of Contents and Index and read all relevant parts of the chapters.