

BIOLOGY 3350 – Comparative Vertebrate Anatomy
Fall 2008

Instructor: Scott Reese, Ph.D.	Lecture Room: SC 214
Office: SC 323	Lecture Time: T Th 02:00-3:15 PM
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TENTATIVE SCHEDULE¹

Date	Topic	Text²	Lab³
T. 19 Aug.	Course Introduction, NOS, History of Science	Chapt. 1	Independent Study
Th. 21 Aug.	Evolution, Systematics, Vertebrates	Chapt. 1	Independent Study
T. 26 Aug.	Evolution, Systematics, Vertebrates- Remote Use Starts	Chapt. 1	1-Shark <i>Self Study Quiz - Due</i>
Th. 28 Aug.	Vertebrate Origins <i>Chapter Essay 1 Due (C-2)</i>	Chapts. 2, 3	1-Shark
T. 02 Sept.	Vertebrate Origins	Chapts. 2, 3	2-Shark
Th. 04 Sept.	Vertebrate Origins	Chapts. 2, 3	2-Shark
T. 09 Sept.	Vertebrate Diversity	Chapt. 3	3-Shark
Th. 11 Sept.	Vertebrate Diversity	Chapt. 3	3-Shark
T. 16 Sept.	Size and Shape <i>Chapter Essay 2 Due (C-4)</i>	Chapt. 4	Exam I
Th. 18 Sept.	Biophysics & Embryology	Chapts. 4, 5	Exam I
T. 23 Sept.	Exam I	Chapts. 1, 2, 3, 4	1-Mudpuppy
Th. 25 Sept.	Embryology	Chapts. 5	1-Mudpuppy
T. 30 Sept.	Embryology	Chapt. 5	2-Mudpuppy
Th. 02 Oct.	Coelom & Embryology	Chapt. 5	2-Mudpuppy
T. 07 Oct.	Axial Skeletal System <i>Chapter Essay 3 Due (C-7)</i>	Chapts. 7, 8	3-Mudpuppy
Th. 09 Oct.	Axial Skeletal System	Chapts. 7, 8	3-Mudpuppy
T. 14 Oct.	Axial Skeletal System	Chapts. 7, 8	Exam II
Th. 16 Oct.	Axial Skeletal System	Chapt. 7, 8	Exam II
T. 21 Oct.	Appendicular Skeleton <i>Chapter Essay 4 Due (C-9)</i>	Chapt. 9	1-Cat
Th. 23 Oct.	Appendicular Skeleton	Chapt. 9	1-Cat
T. 28 Oct.	Appendicular Skeleton	Chapt. 9	2-Cat
Th. 30 Oct.	Exam II	Chapts. 5, 7, 8, 9	2-Cat

T. 04 Nov.	Respiration	Chapt. 11	3-Cat
Th. 06 Nov.	Respiration	Chapt. 11	3-Cat
T. 11 Nov.	Respiration	Chapt. 11	4-Cat
Th. 13 Nov.	Circulation <i>Chapter Essay 5 Due (C-12)</i>	Chapt. 12	4-Cat
T. 18 Nov.	Circulation	Chapt. 12	Exam III
Th. 20 Nov.	Circulation	Chapt. 12	Exam III
T. 25 Nov.	Digestion	Chapt. 13	
Th. 27 Nov.	NO CLASS-Fall Break		
T. 02 Dec.	Digestion	Chapt. 13	<i>Lab Notebooks - Due</i>
Th. 04 Dec.	FINAL EXAM	02:00-04:00 PM	

¹ Please be aware that this schedule is tentative.

²Text Book: Kardong, K. V. 2002. *Vertebrates: Comparative Anatomy, Function, Evolution*. 4th Ed. McGraw-Hill, Boston, MA.

³Lab Manual: Fishbeck, D. W. & A. Sebastiani. 2001. *Comparative Anatomy: Manual of Vertebrate Dissection*. Morton Publishing. Englewood, CO.

COURSE DESCRIPTION

BIOL 3350. Comparative Vertebrate Anatomy. 3-3-4. Prerequisite: BIOL 2107, 2108. A survey of representative vertebrates and related chordates emphasizing phylogeny and anatomical adaptations. Evolutionary trends are examined in the context of large-scale environmental changes that have occurred over geological time. Lab component will have students dissecting selected vertebrate organisms and experimentally determining the physical forces acting on the evolution of vertebrates.

COURSE PHILOSOPHY

Comparative anatomy is an upper level course designed for biology and related majors. Prerequisites for this course are 10 quarter hours or 8 semester hours of majors level introductory biology. If you do not have these prerequisites, drop this course. Students without these prerequisites will be administratively withdrawn from the class.

The major emphasis of lectures will be on the evolution of vertebrates (craniates) and the major changes that have taken place in the anatomy of vertebrates. The focus will be on certain key events that occurred in the evolution of vertebrates (e.g., evolution of vertebrates from proto-vertebrate ancestor; evolution of jaws; anatomical changes that occurred at the water to land transition). Within this evolutionary context, you will learn descriptive morphology (i.e., the names of structures) and functional anatomy (i.e., how the structures work).

The major emphasis of labs will be on dissecting vertebrate organisms and learning anatomical structure. Key examples of anatomical transitions will be represented by a lamprey, a shark, an amphibian salamander (mudpuppy), and a cat. In addition, we will look at proto-chordates to view the early history of vertebrate evolution. The major push in lab will be the identification of anatomical structures that span many of the systems learned in lecture. This is one of the most important parts of comparative anatomy and represents a large fraction of your overall course grade.

COURSE OBJECTIVES

1. *Evolution of Form & Function*: Students will understand the centrality of evolution as the natural process governing why/how particular anatomical forms have arisen during life on this planet; using vertebrates as specific examples. Students will
 - a. **recognize** evolutionary patterns and
 - b. **apply** those patterns to various anatomical traits, especially as those traits support an organism's niche.
2. *Integration of Biology & Physics*: Students will
 - a. **recognize** physical principles as they apply to biological systems, and
 - b. **explain** why and how evolution of vertebrate anatomy is constrained by the same physics as the rest of the natural world.
3. *Quantitative Skills*: Students will
 - a. **recognize** where quantitative applications are necessary and correctly
 - b. **construct** mathematical/physical models,
 - c. **arrange** the model for different situations, and
 - d. **solve** the model for appropriate understanding.
4. *Reading and Writing*: Biology students must be effective readers and writers to succeed in the natural sciences. Thus, students will
 - a. **summarize** assigned readings in an accurate, thorough, yet concise writing style and
 - b. **critique** the writing of others.
5. *Dissection*: Students will
 - a. **manipulate** preserved specimens, comfortably initiating appropriate techniques to
 - b. **analyze** the anatomical relationships among vertebrates and
 - c. **employ** safe lab procedures and protocols for dealing with biological specimens.
6. *Vertebrate Anatomy*: Students will
 - a. **identify** anatomical structures in representative vertebrates and
 - b. **compare** them to describe the probable evolutionary scenarios surrounding particular systems.

COURSE POLICIES

Attendance and Participation: Class attendance and participation is highly encouraged and will be worth points. If you miss a lecture, it is your responsibility to obtain lecture

notes from a classmate; my notes will not be made available to students. If you miss a lab, it is your responsibility to learn the material required. **As part of the required materials for this course, you must purchase/obtain a personally identified, SRS remote for the Beyond Question system;** they are available in the bookstore. During lecture I will be asking questions periodically and you will be required to use the remotes to answer the questions. If your remote is recorded as having answered all of the questions during a class period then you will be counted as present and participating for that lecture. If you fail to answer all the questions or do not attend, you will not be counted as attending or participating for that lecture and will lose points accordingly. Please arrive before the beginning of lecture so as not to disturb your fellow students. You are encouraged to ask questions during lecture and lab. Turn off all cell phones, pagers, etc.

Inclement weather: Should inclement weather arise such that the university closes (you can check the status of the university at [this website](#), or by listening to WSB TV and radio), then these points will be adjusted accordingly. If the university does not close, then class will be held and these points will be tallied. Essays will not be excused for inclement weather and if the school closing is on an exam day, then please come prepared to take the exam on the next scheduled class time.

Lab Preparation: You have 3 hours of lab time scheduled each week to dissect the animals and learn the anatomical structures. To make the most of this time, you need to come prepared, having looked at the material for a given day and done preparatory work before arriving. To encourage this behavior, there are pre-lab quizzes/assignments on [WebCT](#) that you need to complete before coming to lab. There are no make-ups for these class materials and completion of these materials will be a part of the grading scheme. There are lab DVDs available for purchase in the bookstore covering the dissected specimens; **you are required to purchase a set of DVDs** for this course. You may use these to help you with the material.

Although you have 3 hours of scheduled lab time, if that is all the time you spend in the lab, you will find it exceedingly difficult to succeed in this course. As such, the lab is available for student access anytime that there is not another class scheduled Monday-Thursday from 8 AM till 8 PM and on Friday from 8 AM till 5 PM. The times are dependent on the presence of myself, Dale Zaborowski, and/or Nannette Reese. There are no weekend times unless scheduled by me. Access to the lab will be controlled with TESA cards that will be individually distributed to students following drop/add week. You are responsible for the use of the card and the return of the card immediately upon finishing the course (or before if you should leave the course before the end). A hold may be placed on your registration if you fail to return the TESA cards. The cards will be collected on the Monday before each of the lab exams and returned the Monday after; **failure to turn in your cards on that Monday could result in a zero for the lab exam.**

To help you monitor your lab use time, there are individual data sheets for each student in the lab. You will fill these out each time you are in the lab, including any scheduled class times you attend. There is no point in artificially inflating your time spent in lab on these sheets as I will not be using them for distributing points and you will

only be lying to yourself. However, failure to complete these data sheets regularly will result in the loss of participation points for this class

1st Week of Lab

You'll note that you are scheduled for independent study the first week of lab/class. The material you are required to learn is posted on the course website (see [WebCT](#)) and they have been placed out on the side counter in the lab. Although you don't have your TESA cards by this point, you can ask myself, Dale Zaborowski, and/or Nannette Reese to let you into the room to study the materials during the lab times listed above. When you feel you have adequately learned the material, you can access and take the quiz available on the course website over this material. You will get 1 chance to take the quiz and you are not allowed to use other students, websites, or books while taking the quiz; should I discover that you have I will start judicial proceedings for your behavior and probably fail you for the course. **You are required to have finished the quiz no later than the start of lab on August 26th.**

Safety is extremely important while working in the lab. Please refer to the departmental laboratory safety guidelines for the rules governing laboratory behavior.

Laboratory/Research Journal: As part of this course, you will be maintaining a laboratory/research journal. This will be your chance to collect data as a comparative anatomist and look at the evolutionary relationships among the animals you are studying. You will be required to select an anatomical system from the list provided, keep detailed observations over the course of the semester, work with others on the material, research the primary literature, and write a supported analysis by the end of the semester covering your work in this journal. Twice during the semester you will be required to show your progress to me; this can be at your discretion, but failure to complete these midsemester checks will cause you to lose points. Please see the course website ([WebCT](#)) for a more detailed description of this assignment.

Examinations: There are two lecture examinations scheduled during the semester along with a final exam. Each exam will be over the material covered in the lectures and readings since the last exam with emphasis being placed on the lectures. The final exam will be cumulative, although weighted heavily to new material. You must take all exams on the date offered. **If you are unable to take the exam on the given date, you must have an acceptable reason** (these need to be dire situations, not just your buddies party was the night before) **and you must contact me before 9:30 AM the day of the exam.** An email is fine, though special effort should be made to speak to me directly. If I find your excuse acceptable (and you better have a good document trail), then your exam will be forfeited and whatever you achieve on the cumulative portion of the final will substitute for this score. Please be advised, you do not want to make the final weighted this heavy except in the direst of circumstances. If you miss an exam without an acceptable excuse, documentation, or without having contacted me before the proscribed time, you will receive the grade of 0 (zero) for that exam. You **must** take the final exam to receive credit for this course. There are three lab examinations scheduled during the

semester. Each exam will be over the material covered up to that point, there is no cumulative final. If you receive 50% or less of the points on the first lecture or lab exam, please talk to me. Such a score indicates that you are having trouble in this class and you may need to consider withdrawing.

Chapter Essays: There is a required essay for some chapters of the text. Each essay will be not more than 2-pages and will summarize the content of each chapter. They will be graded based on the scoring rubric that can be found on the course website. This assignment is very complex and you should read over the learning module on Vista very carefully. The due dates for each essay and the steps that follow are extremely important and tardiness will more than likely lead to elimination of the points for that essay. Each essay will be worth 10 points. If you fail to turn in one of the essays you will be given a score of 0. You will be reviewing other essays in the class via a double-blind system (see Vista) and your reviews will be incorporated into your score on each essay. In other words, your score for a given essay will be a combination of how well you wrote yours and how well your reviewed others. There are no make-ups for the essays. You will utilize the plagiarism website or you will receive a score of 0 for an essay. **FOLLOW THE DIRECTIONS CAREFULLY**, this is a very complex learning assignment and it will be very unforgiving if you don't get it right.

Grades: The grading procedure for this course is as follows:

Lecture Exam I	100 pts.
Lecture Exam II	100 pts.
Lecture Final Exam	150 pts.
Chapter Essays	50 pts.
Quantitative Question Sets	20 pts.
Lab Exam I	100 pts.
Lab Exam II	100 pts.
Lab Exam III	100 pts.
Laboratory Journal	50 pts.
Pre-vertebrates/chordates	25 pts.
Pre-Lab Quizzes	20 pts.
Mid-semester Journal Checks	10 pts.
Participation	20 pts.
Total	845 pts.

Your grade for this course will be based on the following point distribution: A 756-845 pts.; B 672-755 pts.; C 587-671 pts.; D 503-586 pts.; F < 502 pts. There is no "extra-credit." Dates and total points are subject to change if there are circumstances, deemed by me, to be extenuating. You will be given verbal notification of any changes in class or it will be posted on [WebCT](#). The final grading scale may be adjusted at the discretion of the instructor and you will be informed via [WebCT](#).

Accommodations: Any student with a documented disability or medical condition needing academic accommodations of class-related activities or schedules must contact the instructor immediately. Written verification from the *KSU disAbled Student Support*

Services is required. No requirements exist that accommodations be made prior to completion of this approved University documentation. All discussions will remain confidential.

Academic Honesty: Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section II of the Student Code of Conduct addresses the University's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/falsification of University records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the University Judiciary Program, which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement.

You are expected to follow the regulations as stated on pages 233-236 of the 2003-2004 of the Kennesaw State University Undergraduate Catalog. Plagiarism and cheating of any kind will not be tolerated. This includes copying papers and not providing proper literature citations. Any violations of the Student Conduct Regulations will be handled through the University Court.

Withdrawal Policy: NEW ACADEMIC WITHDRAWAL POLICY EFFECTIVE FALL SEMESTER 2004

Students may withdraw from one or more courses anytime before the last three weeks of the semester. *However, as of Fall 2004, students will be allowed a maximum of eight total withdrawals if they enter KSU as a freshman. Transfer students will be allowed one withdrawal per fifteen credit hours attempted, for a maximum of eight.* Students who choose to pursue a second degree at KSU will be allowed two additional withdrawals. Students who entered KSU before the Fall of 2004 will be allowed one withdrawal per fifteen credit hours attempted for a maximum of eight. To withdraw, the student should complete an official withdrawal form in the Office of the Registrar. Students who officially withdraw from courses on or before the last day to withdraw without academic penalty will receive a "W". Students who officially withdraw after the last day to withdraw without academic penalty (and before the last three weeks of the semester) will receive a "WF", which will be counted as an "F" in calculation of their grade point average.

The only exceptions to these withdrawal regulations will be for instances involving unusual circumstances, which are fully documented. *Students may appeal to the academic standing committee for consideration of unusual circumstances.*

**LAST DATE TO WITHDRAW WITHOUT ACADEMIC
PENALTY
Fall 2008**

October 10, 2008

Recycling Policy: **REDUCE WASTE AND RECYCLE.** If possible, please use (purchase) recycled goods. On campus, paper can be recycled in the bins found in the front of each classroom and aluminum cans can be recycled in the appropriate containers in the hall. Please do not mix waste with the materials to be recycled. It's your planet, your campus, your health & well-being and your economy -- help them all by recycling. See page 248 of the current catalog for the KSU Position Statement on Environmental Awareness.

URL: Copies of this syllabus can be found on the instructor's Homepage. The URL is: <http://science.kennesaw.edu/~sreese3/Comparative%20Anatomy.html> or the course webpage: <http://vista.kennesaw.edu>

Office Hours: My office hours are listed on the first page of this syllabus. I encourage you to avail yourself of them. If you cannot make it to any of these scheduled hours, please make an appointment. I'm certain that we can find a mutually acceptable time to meet.

Your continued presence in this course signifies your acceptance of the policies and procedures outlined above.