

**Fayetteville State University**  
**College of Arts and Sciences: Dept. of Biological Sciences**  
**Spring 2012 course syllabus: ZOOL 350: Comparative Anatomy**

**I. Locator information**

3.0 semester hrs of credit

Class times:

Section 01: Lecture	M 12:00 noon - 1:50 p.m.	Room: LSA 247
Lab:	W 12:00 noon - 1:50 p.m.	Room: LSA 245

Instructor: Phil Senter, Ph.D.

Office location: LS 126    Office phone: 672-1304    Email: psenter@uncfsu.edu

Office hrs: MWR 9:00 – 11:00 a.m., T 4:00 – 6:00 p.m., and by appointment

**FSU Policy on Electronic Mail:** Fayetteville State University provides to each student, free of charge, an electronic mail account ([username@uncfsu.edu](mailto:username@uncfsu.edu)) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.

Rules and regulations governing the use of FSU email may be found at  
<http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf>

**II. Course description:**

A comprehensive study of the anatomy of chordates, with two (2) hours of laboratory studies consisting of study (including dissection) of anatomical systems of representative chordates. Prerequisite: BIOL 200.

**III. Disabled Student Services:** In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.

**IV. Textbooks:**

**Main text:** Kardong, K. V. 2005. Vertebrates: Comparative Anatomy, Function, Evolution, 6th ed.

**Lab manual:** Senter, P. 2010. ZOOL 350 Comparative Anatomy Lab Manual, Ninth Edition (available free on Blackboard).

**V. Course objectives and student learning outcomes**

Upon completion of this course, students will be able to:

- A. Describe the phylogenetic relationships among the major chordate taxa.
- B. Describe the anatomical transformations that have occurred in the chordates during their evolution.
- C. Correctly use the anatomical and taxonomic terminology covered in the course.
- D. Identify the chordate body parts studied in the course.
- E. Identify homologous structures among chordates.

Mastery of the five student learning outcomes listed above will be measured by student performance on examinations.

Disclaimer: Policies outlined below are subject to change if the instructor deems necessary.

**VI. Evaluation criteria and grading scale:**

Four lecture exams (including the midterm and final), 70 pts apiece.	Total: 280 pts. (open-book, open-notes)
Three lab exams, 50 pts apiece.	Total: 150 pts (closed book, closed notes)
Lab participation (10 labs × 4 pts apiece for taking an active role in dissection, cleanup, lab exercises, and/or going over terms with lab partners)	Total: 40 pts
Taxonomy homework (3 exercises × 2 pts apiece):	Total: 6 pts (handwritten, hard-copy)
Term paper (see Appendix to this syllabus), 60 pts	<u>60 pts</u>
	Grand total: 536 pts

The grading scale is a ten-percent scale. In other words, a semester grade of A is awarded if the student earns  $\geq 90\%$  of 536 pts, a semester grade of B is awarded if the student earns 80-89% of 536 pts, etc.

**New FSU attendance and grading policy**

Grades of “WN” are no longer given.

A grade of “FN” (F due to non-attendance) is given to a student who attends zero, one, or two class periods in a semester and does not withdraw but instead remains on the roster. Lab periods are considered class periods.

New type of grade: Interim Grade. An Interim Grade of “X” (no show) or “EA” (excessive absences) may be given early in the semester as a warning to the student. Interim Grades do not influence GPA. They are reminders to the student to decide whether to withdraw or to increase attendance.

**Attendance and Student Behavior Expectations:**

The instructor will be respectful of all students and expects all students to accept their responsibility for maintaining a positive classroom environment by abiding by the following rules:

- Student/teacher interactions, as well as interactions among peers, must be congenial and respectful.
- Students are expected to arrive to class on time when possible, remain in class until dismissed by the instructor, and refrain from preparing to leave class until it is dismissed.
- Students are asked to refrain from answering or checking cell phones or pagers during class. It is rude.
- The following are forbidden in the classroom: (a) food (exceptions: hard candy, cough drops), (b) carrying on private conversations during class, (c) wearing headphones or other potentially distracting paraphernalia, (d) popping gum during class.
- Food and drink are forbidden in the lab (OSHA regulations).
- Use only the lab drawers and materials set aside for this class. Leave the other classes' materials alone.
- Lab periods are less formal than lecture. After the professor's initial spiel, once the students have begun the lab work, conversation among and between lab groups is encouraged.

**Consequences for Failing to Meet Behavioral Expectations:** The professor will use his own judgment as to whether, in response to such failure, he will merely remind the student to stop engaging in the behavior, ask the student to leave for the rest of the class period, or take other action. In extreme or repeated cases, the instructor may report the student to the Dean of Students for disciplinary action according to the FSU Code of Student Conduct.

**Course requirements and exam policies**

A. Bring to every lecture exam: (1) a pencil, (2) white-out.

B. Make-up exams:

- A make-up exam is arranged only if the student requests one.
- A make-up exam must be taken within a week after the scheduled exam.
- To discourage habitual absence on exam days, the score of a make-up exam is reduced by 10 points if the student has previously taken at least two make-up exams in the same semester, unless the student provides documentation for a legitimate reason (e.g. medical situation, family emergency, auto trouble, participation in a school event) for having missed the regularly scheduled exam. Legitimate reasons do not include forgetfulness, oversleeping, or not being ready to take the exam. The last day to turn in documentation is the day *before* the student's regularly scheduled final exam.

C. Prearrangements to take an exam at an alternate time/date are not the same as make-up exams and do not necessarily require extraordinary circumstances or documentation. Please let the prof. know far enough ahead of time if a prearrangement is needed.

D. Location: If a prearranged or make-up exam cannot be taken in the professor's office during office hours, it will be taken in the University Testing office (Collins 109). The University Testing office requires that the student make an appointment with at least one day's notice (call 672-1815); appointments cannot be changed.

E. Tardiness: Arrival more than 15 minutes late to an exam more than once results in a reduction of the student's exam score by 10 points, unless the student provides documentation for a legitimate reason (see B3, above) for the lateness.

F. Cheating: The instructor will adhere to University policy concerning cheating.

G. Tardiness to lab periods: Starting with the first week of cat/shark/mudpuppy dissection, a student will receive only half credit for participation for any lab period in which he or she shows up at least 10 minutes late, unless documentation is provided for a legitimate reason (see B3, above) for the tardiness.

H. A waiver of lost lab participation points may occur if the student provides documentation for a legitimate reason (see B3, above) for absence on a lab day. The last day to turn in documentation is the day *before* the date of the last lab exam for the student's course section (the original date, not the date of a make-up or prearranged lab exam).

## VII. Academic support resources

Smarthinking: Listed in "Tools" menu as a Blackboard course in Blackboard. Help with organization and style for term papers.  
University College Writing Center: Chick 001B, ph: 910-672-2455. Hrs: M-R 9:00-6:00, F 10:00-2:00. Proofreading, help with grammar.

ZOOL 350 study guides: available via Blackboard

Examples of previous semesters' term papers: available via Blackboard

Science Direct and Journal Finder: available via FSU library's web page

## VIII. Course outline and assignments (dates subject to change):

Week of	Lecture topic	Lab topic
Jan 9	Ch. 1, 4, 18, 2: Intro, Protochordates	Lab 1: Protochordate anatomy and taxonomy
Jan 16	[no class Mon]	lecture during lab time: Ch. 3: Vertebrates
Jan 23	Ch. 5: Life history	*Lab 2: Hagfish and lamprey dissection; external anatomy of shark, perch, and mudpuppy
Jan 30	<b>Lecture Exam 1</b>	Lab 3: Integument, dentition
Feb 5	Ch. 6: Integument <i>Taxonomy homework due this week</i>	term paper instructions; review
Feb 12	Ch. 11: Respiratory system	<b>Lab Exam 1</b>
Feb 19	Ch. 12, 10: Circulatory and Muscular systems	*Lab 4: Dissection: skinning the shark, mudpuppy, and cat
Feb 26	<b>Lecture Exam 2</b>	*Lab 5, 6: Dissection: muscular system, nervous & sensory systems
Mar 5	<i>Midterm Break</i>	<i>Midterm Break</i>
Mar 12	Ch. 13, 15, 16: Digestive, nervous, and endocrine systems	*Lab 7: Dissection: internal anatomy
Mar 19	Ch. 17: Photoreception, Mechanoreception	<b>Lab exam 2</b>
Mar 26	<b>Lecture Exam 3</b>	Lab 8: Skull
Apr 2	Ch. 7: Skull; <i>Term paper due this week</i>	Lab 9: Postcranial skeleton
Apr 9	Ch. 8: Axial skeleton	Lab 10: Third skeleton lab
Apr 16	Ch. 9: Appendicular skeleton	<b>Lab exam 3</b>
Apr 23		
	Ch. 14: Urogenital system	<b>Final exam for graduating seniors</b>
Apr 30	<b>Final exam: Section 01: TBA</b>	

\*Clothing protection needed. This can be a lab coat or an old shirt or apron.

## IX. Instructional style:

Comparative Anatomy is a lecture-based course designed to present basic concepts and facts concerning the anatomy and evolution of chordates with emphasis on vertebrates. Much of lecture will be presented with overhead transparencies and with frequent use of visual aids. For the laboratory, students will work in teams, one team per lab table. The instructor will provide the specimens to be studied, the list of body parts to be identified, and assistance in finding parts as needed.

## X. Bibliography

In addition to the text there are a number of other useful books that relate to the material covered in this course and could be used for optional, supplementary reading. Examples:

Carroll, R. L. 1988. Vertebrate Paleontology and Evolution. W. H. Freeman Co.

Hildebrand, M. and G. Goslow. 2002. Analysis of Vertebrate Structure. John Wiley and Sons.

Kemp, T. S. 2004. The Origin and Evolution of Mammals. Oxford University Press.

Long, J. A. 1996. The Rise of Fishes: 500 Million Years of Evolution. Johns Hopkins University Press.

Prothero, D. 2007. Evolution: What the Fossils Say and Why It Matters. Columbia University Press.

Name: \_\_\_\_\_

**ZOOL 350: Rubric for Grading Term Papers**

	<u>Possible points</u>	<u>Points earned</u>
<u>Content (25 points)</u>		
Appropriate choice of subject (author has chosen to contrast an organ, organ system, or physiological function between two types of chordates) <sup>1</sup>	5	_____
There are no factual errors	5	_____
Level of detail	5	_____
Differences between the two chordates are emphasized and explicitly stated. <sup>2</sup>	5	_____
A large number of differences between the two chordates are given. <sup>3</sup>	5	_____
<u>Grammar, spelling, and mechanics (18 points)</u>		
Every sentence makes sense.	2	_____
Punctuation is correct. <sup>4</sup>	3	_____
There are no run-on sentences or sentence fragments. <sup>5</sup>	3	_____
Every word is spelled correctly. <sup>6</sup>	3	_____
There are no other grammatical errors. <sup>7</sup>	5	_____
The paper is broken into paragraphs that are well organized. <sup>8</sup>	2	_____
<u>Format (17 points)</u>		
Length: text 2 to 5 pages	2	_____
Typed, double-spaced, 12-point font	3	_____
Correct use of parenthetical citation <sup>9</sup>	5	_____
Bibliography format ( <i>see instructions in syllabus for modified JVP format</i> ) <sup>10</sup>	5	_____
No websites used as information sources <sup>11</sup>	2	_____
<b><u>Total (60 points)</u></b> <sup>12</sup>	<b>60</b>	_____

Appendix: Comparative Anatomy Term paper instructions

1. Write a 2 – 5 page paper (double-spaced, 12-point font), in which you contrast (describe *differences* between) some aspect of anatomy and/or physiology between two different types of chordates.

Choose an organ, an organ system, or a function (e.g. locomotion, vision, hearing), and describe how it is different between two different types of chordates (for example: the human skeleton vs. the horse skeleton; or reproduction in tunicates vs. reproduction in chickens). You do not have to stick with just one organ/system/function. If necessary to fill the minimum number of pages you may add information from another organ/organ system/function.

The chordates you choose can be living or extinct. They can be specific species (e.g. domestic duck) or a group (e.g. birds).

2. You must explicitly state the differences between the two chordates, even the obvious (for example, if you are contrasting human and bird reproductive systems and you state that a bird has only one ovary, then to get points you must also mention that a human has two ovaries).

3. The full 5 points are awarded for 10 differences. However, it is safer to list at least 20 differences, because sometimes what the student considers two differences, the professor considers two different ways to say the same thing.

4. Here are corrections to common period and apostrophe errors. Avoid these and other punctuation errors.

Incorrect (period before parentheses):

An elephant's testicles are inside the abdomen. (Lawton, 1964)

Correct (period after parentheses):

An elephant's testicles are inside the abdomen (Lawton, 1964).

Correct use of apostrophe and "s":

Aliens have eyes. Aliens' eyes are on their heads. An alien's eyes are on its head.

↑	↑	↑
plural (no apostrophe)	plural possessive (more than one alien) ("s," then apostrophe)	singular possessive (just one alien) (apostrophe, then "s")

Correct use of "its" (belonging to it) and "it's" (short for "it is"):

An alien's swoofwboggle is on **its** head. **It's** used to count ice cream cones.

5. A run-on sentence is two sentences that are not separated, and a sentence fragment is not a complete sentence. For example:

Run-on sentence (incorrect): A flatworm does not have a **heart**, a human has a heart.

Correct grammar: A flatworm does not have a **heart**; a human has a heart.

A flatworm does not have a **heart**. **A** human has a heart.

A flatworm does not have a **heart**, **but** a human has a heart.

Sentence fragment (incorrect): **Whereas** a human eats and defecates through separate openings.

Correct grammar: A jellyfish eats and defecates through the same opening, **whereas** a human eats and defecates through separate openings.

6. One common error is to write "where as" ("whereas" is one word). Avoid this and other spelling errors.

7. The word "their" is often misused. Avoid this and other errors.

Incorrect use of "their":

The snake uses **their** tongue to pick up chemicals.

Correct grammar:

The snake uses **its** tongue to pick up chemicals.

The snake uses **the** tongue to pick up chemicals.

Snakes use **their** tongues to pick up chemicals.

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Correct use of “their” (belonging to them), “they’re” (they are), and “there” (a location):  
 Aliens use **their** eyes for vision. **They’re** on the head, and the ears are also **there**.

8. Avoid writing the whole paper as one long paragraph. Remember to indent each new paragraph. Put information on similar subject matter in the same paragraph.

9. **This paragraph demonstrates parenthetical citation.** Cite sources—all of which must be listed in the bibliography—at the end of each sentence, group of sentences, or paragraph. At the end of a sentence or group of sentences containing information from one source, enclose the author’s last name, followed by a comma and year of publication, in parentheses (Smith and Brown, 2001). The period at the end of the sentence comes after the parenthetical citation (Rogers, 1992). For a paragraph or sentence containing information from more than one source, you may cite all sources together, separated by semicolons, in one set of parentheses (Rogers, 1992; Smith and Brown, 2001). “A **direct quote** from a source must be placed in quotation marks. The closing quotation mark comes before the parenthetical citation. The citation includes the page number(s) from which a direct quote is taken” (Smith, 2001, p. 30-31). Page numbers are needed only for direct quotes. If a source has three or more authors, it can be cited using the first author’s last name followed by “et al.” (Jones et al., 1994). If the author’s name is not given, the author is Anonymous (Anonymous, 1987).

10. **Use modified JVP (Journal of Vertebrate Paleontology) format, not MLA or APA, etc.** There are dozens of bibliography formats, and some (e.g. APA and MLA formats) are standard for some disciplines. However, the biological sciences do not have a single standard format, so your professor has arbitrarily chosen a modified JVP (Journal of Vertebrate Paleontology) format for this assignment. Here are examples:

Books:

Bloink, B. D. and Zloo, R. K. 2001. The Big Book of Wonderful Stuff. Zippityzee Press, Sacramento.

Articles:

Zlurp, L. M. 1962. Oh, for Pete’s sake, why no chickens in my closet? Closets and Bedrooms 25(3):74-78.

Volume #    Issue #    Page #s

Encyclopedia entries:

Kloob, S. N. 1980. Lampshades. Pp. 38-39 in The Encyclopedia of Household Products, Vol. 6. Zippityzee Press, Sacramento.

Include the publisher and city for books and encyclopedia entries.

Put period after year, after title, and at end of each entry.

Authors’ first and middle names are represented by initials

11. Your bibliography must include at least two sources. Books (including the textbook), encyclopedias, and journal articles are allowed. Web sites are not. Books, encyclopedias, and journal articles published online are allowed; list them in the bibliography as if they are hard copies. The bibliography may be at the end of the text or on a separate page.

**To help you find books in the library: FSU Library call numbers for books:**

QL	Animals, species by species (e.g. a book on frogs, a book on turtles, a book on whales)
QM	Animals, body part by body part (e.g. a book on animal eyes, a book on animal nervous systems, a book on animal digestive systems)
SF	Veterinary anatomy/physiology/medicine (including zoo animals)
QE 800s	Extinct animals
QP	Humans
GN 280s	Extinct relatives of humans

## Term Paper: Frequently Asked Questions

**How should I turn the paper in?** Hard copy is preferred. Handing it to the prof. or sliding it under his office door are both acceptable. If running out of time close to the deadline, a paper may be turned in via email (but not via Blackboard).

**May I describe similarities between the two chordates?**

You may, but it will not earn you any points. For this paper, points are earned for describing differences.

**May I describe differences in classification, habitat, or behavior?** You may, but these things will not earn you any points; for this paper, points are earned for stating *anatomical and/or physiological* differences between the two chordates.

**I took this course previously. May I recycle my old term paper?** No. A new semester requires a new term paper.

**What are the turn-in deadlines? (note: early turn-ins are OK)**

Mar 19 - 23 (M - F): Last week to get *2 extra credit points* for having turned term paper in early.

Mar 26 - 30 (M - F): Last week to get *1 extra credit point* for having turned term paper in early.

Apr 2 - 6 (M - F): Term paper due.

Apr 9 -12 (M - Th): Final draft can be turned in late, with 10 (out of 60) points off. *No late papers will be accepted after Apr. 12.*

**May I turn in more than one draft of the paper?** Yes. Each time you turn in a draft, the paper will be graded and the grade will be recorded. The grade on an improved second/third/etc. draft replaces the grade from a previous draft.

**Do bonus points from an early draft continue onto subsequent drafts?** No. Each draft is graded according to when it was turned in. This means that a draft turned in on time will be graded as if it is on time, even if previous drafts were early. A draft that is turned in late will be graded as if it is late (with 10 out of 60 points off), even if it is an improved draft.

**May I see examples of previous semesters' term papers to use as a model?** Yes. These are available on Blackboard and via email as pdf files upon request.

**How do I avoid a charge of plagiarism?**

Plagiarism is the presentation of someone else's work as your own.

To avoid a charge of plagiarism, you must:

- (1) *Reword* the information from your source (i.e. put it in your own words)
- (2) Use *quotation marks* for all direct quotes of your sources (see below)
- (3) Provide *citation* (parenthetical citation or footnotes; for this paper, you will use parenthetical citation) and a *bibliography*.
- (4) Write your own paper instead of having someone else write it for you (although it is OK for someone else to proofread it for you), and do not turn in someone else's paper from a previous semester or this semester.

**Extra credit (10 points):**

A 10-question, multiple-choice survey will be posted on Blackboard, under Assignments, sometime in January. The survey is on evolutionary theory and the Bible, and includes a short (6-page) article that must be read after answering the first few questions and before answering the rest. Results of the survey will be published as part of a statistical study on public opinions toward evolutionary theory and the Bible. Survey-takers and their answers will remain anonymous.

Due date for completion of survey: Friday, Jan. 27