COURSE INFORMATION

INSTRUCTOR -- Dr. Anthony H. Bledsoe

LECTURES -- Mondays, Wednesdays, and Fridays, 12:00 noon - 12:50 pm, A221 Langley Hall

OFFICE HOURS -- Tuesdays, Wednesdays, and Fridays, 2:30 - 3:30 pm, A351 Langley Hall; also by appointment, as needed.

COURSE OVERVIEW

The purpose of this course is to study the anatomy and diversity of the vertebrate body within the contexts of function, development, and evolutionary modification. We will begin with a review of the phylogeny and classification of the vertebrates, followed by an analysis of their basic tissues and early embryonic development. Then each organ system will be considered in turn, including gross and microscopic anatomy, function, and evolution. General principles of evolutionary morphology will be emphasized.

TEXTBOOK

The text for this course is FUNCTIONAL ANATOMY OF THE VERTEBRATES, AN EVOLUTIONARY PERSPECTIVE, 3rd Edition, by Karel F. Liem, William E. Bemis, Warren F. Walker, Jr, and Lance Grande, 2001. The text is intended to complement the lectures. Some topics are covered in the lectures but not in the text; others are in the text but not the lectures. Exams will cover only the topics in the lectures.

RESERVE BOOKS

Several books have been placed on 2 hour/overnight reserve in Langley Library; a list is provided on a separate handout. These books cover various topics in greater detail than your text. Their purpose is to provide a source of background information when you study; their use is optional. It might be a good idea to look over some of them at your leisure early in the term to get an idea of how they might be useful.

EXAMINATIONS

There will be four examinations, on the dates given on the course schedule. Three of the examinations will be one-hour midterm exams, and one will be a comprehensive final exam. Each of the midterm exams will be worth 100 points and will cover the preceding section of the course. The final exam will be worth 100 points and will cover the entire course.

Missed Examinations: If you miss an exam for an acceptable reason, your grade will be based on the remaining 3 exams. Makeup exams are not given except in special cases. The only acceptable reasons for missing an exam are illness, severe personal trauma, and (under exceptional circumstances), University business. If you need to miss an exam for a valid reason, contact me about it before the exam, if possible. Students who miss an exam for an unacceptable reason will receive a score of “0” for that exam.

Sample Examination: An exam from a previous year is available as a handout. Your exams will be similar in length and format.

GRADING

The letter grade you earn will be determined by your percentage of the total points on the four examinations. For example, if you get 300 out of 400 points during the term, your percentage is 75%. During the term you can estimate your grade from the following scale: 90's = A range; 80's = B range; 70's = C range; 60's = D range, 50's and below = F range. On this scale the expected class mean score for a given exam is 75 (middle of the C range). If the mean class score falls below 75%, subtract the mean from
75% and add the difference to your score. Use this adjusted score to obtain your letter grade for each exam, based on the above scale.

Example: Suppose you have a score of 78 on the first exam and the class mean for that exam is 72. Then 75 - 72 = 3. Add 3 to your score: 78 + 3 = 81. Your grade for the first exam is in the low "B" range.

At the end of the term, the average of your four exam scores (adjusted each exam for the class mean, if warranted) will be used to assign your final letter grade, based on the scale above.

ADDITIONAL CONSIDERATIONS

Please note the date and time of each of the examinations, including the final exam, and arrange your schedule and holiday travel so that you can attend and take each examination on the date and time listed on the course schedule.

Also, please note that the use of electronic devices, other than those used for note-taking, is not permitted during lectures.

If you have a disability for which you may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (216 William Pitt Union; 412-648-7890; 412-383-7355 [TTY]) as early as possible. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.
HOW TO STUDY FOR THIS COURSE

A key to doing well in this course is to understand the examinations, their purpose, and their format. The exams are structured to guide your studying effectively. That is, the exam structure provides more than a basis for grading; it also serves as a guide for how you should study for this course. Take a look at the sample exam distributed with this handout. The exam includes terms, definitions, drawings, word problems, and essays, and it tests comprehension at several levels. Basic to all levels is vocabulary. Questions on terms will help you to understand the importance of the proper use of the technical vocabulary of science. Words are tools. Understanding of concepts at advanced levels of comprehension requires the accurate usage of technical terms, which in turn depends on precision in such matters as capitalization, italicization, and spelling. Morphology has an enormous vocabulary, but much insight may be gained by learning to recognize commonly used prefixes, suffixes, and roots. The Glossary and Index (pp. G-1 to G-31 and I-1 to I-24, respectively, of your text) will help you to build a vocabulary. Misspellings of technical terms will cost points on exams; illegible handwriting will be considered misspelling. You will be graded on what you write, not on what you may later claim to have meant.

TYPES OF EXAM QUESTIONS

TERMS: You are given a definition and must supply the word that it defines. Watch out for terms with similar spellings but different meanings, like ilium and ileum. A particular danger lies in terms in which both the spelling and meaning are similar, like vertebrae and vertebrate. In misspelling such a word, you may unintentionally spell another. Understand singular and plural endings.

DEFINITIONS: You are given a word and are asked to define it. A definition is a brief statement telling what the word means, and distinguishing it from other words. A good definition is succinct, correct in its factual information, and complete enough to distinguish the term from related terms. For instance, a good definition of the term Aves would be “The class of vertebrates possessing feathers.” To define it as “A class of vertebrates” is not enough; although the statement is true, it does not distinguish Aves from Mammalia or several other terms.

DIAGRAMS AND WORD PROBLEMS: You are presented with a diagram or word problem and asked to label particular structures in the diagram or solve the problem. Success on these questions requires a clear understanding of structures, their relationship to one another, and their relationship to organismal function and evolutionary history.

ESSAYS: The purpose of essays is to test your command of certain factual information, your ability to form abstractions and generalize from data to concepts, and your ability to organize your thoughts and express them in writing. The most common shortcomings of essays are these:

ERROR: Factual inaccuracy. Example: "Birds predate fishes in the fossil record."

IRRELEVANCIES: You write information that may be true but does not answer the question. Example: I ask for three integumentary synapomorphies of mammals and you reply “only mammals possess a middle-ear apparatus that includes an incus and a malleus.”

VAGUENESS: This may be used in an attempt to hide a lack of specific information, but it is usually apparent to the grader. Example: “The prokaryote nucleus is not as distinguishable.” This is vague; a clear statement would be: “prokaryotes lack a nuclear membrane.”

INCOMPLETENESS: Sometimes part of a question is left unanswered, perhaps because you did not

REPETITION: You may be so charmed by something you have written that you write it again two or three times. This will not multiply the credit awarded; credit will be given only for saying it once, and you will not receive additional credit for the repetitions. Even a clever rewording will not provide additional points for the same statement, which will only be credited once.

THE SHOTGUN METHOD: When you have only a vague idea of the answer, you write everything that might be remotely related, hoping to hit the right idea by chance. This is clearly evident to the
grader because it usually also involves error, irrelevancies, vagueness, incompleteness, and repetition.

GLITTERING GENERALITIES: These are statements that may initially sound profound, but which upon analysis prove to contain little or no information. Example: "Life is the vague quality of being."

The main problem with essays is usually poor organization. You may improve your writing by following these suggestions. (1) Read and understand the question. Determine what is wanted and what is not. (2) Arrange your main points in a logical sequence. (3) Write as briefly as possible, using only words whose meaning you know. Plan an answer for the time available. (4) Read through your essay to see if it makes sense, is accurate, and answers the question that was asked.

STUDY GUIDES

A study guide will be provided for each topic. The purpose of a study guide is to focus your studying on the information relevant to the exam. The guides are not comprehensive, but they do cover much of the material I expect you to know. The exams may include questions taken unchanged from the study guides, or questions different in form but derived from the material in the guides.

HOW TO STUDY

In some ways this is not a hard course. For example, there is no math or chemistry. However, there is plenty of data, much technical vocabulary, and some complex and subtle ideas. The lectures for each topic are designed to follow a sequential approach that should increase learning efficiency. They begin with a general introduction, provide definitions of important terms, and then build up to more complex ideas and relationships. You cannot understand the later stages without mastering the basic terms.

Use your time efficiently. Begin by being an active learner in lecture; avoid the temptation to merely "follow along" and write only what is on the screen. Think about the material as it is presented. Use your study time efficiently as well. Analyze your notes, again being as active a thinker as you can be. You should be tired after lecture, and you should be tired after studying. If you do not experience some sense of fatigue after lecture or studying, you are probably being too passive in your study approach. The exams are based upon the lectures and study guides; the text and reserve books are backups. Don’t spend hours in aimless reading. Concentrate on your lecture notes and study guides.

Study vocabulary with index cards. Put a term on one side and the definition on the other. Use the lectures, text, and reserve books to understand the meaning of a given term; then develop a definition of that term in your own words. Carry cards around to study at odd moments (e.g., on the bus, during commercials). Look at the term and try to define it; also, read the definition and give the term. Quiz each other. It is like studying a foreign language.

To prepare for essay questions, write practice essays for the study guide questions. Check them against your notes and other sources. Are the details accurate? Do you emphasize the points that I did in class? Criticize each other’s essays. See if you can write an essay of appropriate length and quality in the time available on the test. Bring them to me to get feedback before the exam. Do not try to memorize essays verbatim; just learn the material. The exam questions may differ from those on the study guide but nonetheless cover the same material.

The exams are designed to get you to learn both facts and concepts. Good performance requires understanding, which takes time and repetition; last minute cramming will not be effective. Understanding the material itself involves various approaches, from memorization to insight.

Study together before, not during, the exam. Anyone caught cheating will fail.

Final Hint: There will be many handouts. Obtain a three-ring binder, a paper punch, dividers, and reinforcements. Get organized now and avoid confusion later.
RESERVE BOOK LIST

The following books are on 2 hr/overnight reserve in Langley Library:

Andrew, W., & C. Hickman. Histology of the Vertebrates.

Carroll, R. L. Vertebrate Paleontology and Evolution.

de Beer, G. The Development of the Vertebrate Skull.


Gilbert, S. G. Pictorial Human Embryology.

Goodrich, E. S. Studies on the Structure and Development of Vertebrates. 2 vols.


Romer, A. S. The Vertebrate Body.

Torrey, T., & A. Feduccia. Morphogenesis of the Vertebrates.
## COURSE SCHEDULE

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<th>Topic</th>
<th>Text reading</th>
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<td>Chapter 1</td>
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<td>Phylogeny and Classification</td>
<td>Chapters 2 and 3</td>
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<td>Sept. 3</td>
<td>No class -- University holiday</td>
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<td>Phylogeny and Classification</td>
<td>Chapters 2 and 3</td>
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<td>Embryology</td>
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<td>17</td>
<td>Evolutionary Morphology</td>
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<td>Mon</td>
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<td>The Integument</td>
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<td>Wed</td>
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<td>Fri</td>
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<td>The Integument</td>
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<td>Tues</td>
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<td>The Axial Skeleton</td>
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<td>Chapter 10</td>
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<td>Chapter 12</td>
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<td>The Circulatory System</td>
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<td>Conclusions</td>
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<td>11</td>
<td>FINAL EXAMINATION, 8:00 - 9:50 am</td>
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