

BSC 400/500
Vertebrate Functional Morphology

PROFESSOR: Dr. Stephen Secor

CONTACT INFORMATION:

Office: 420 Biology
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OFFICE HOURS: T, Th 11-12:00, and by appointment

REQUIRED TEXT:

Fishbeck D.W. and A. Sebastiani. Manual of Vertebrate Dissection, Comparative Anatomy (for lab)

RECOMMENDED TEXT:

Kardong, K. 2006. Vertebrates, Comparative Anatomy, Function, and Evolution, 3rd or 4th ed.

PREREQUISITES: BSC 114/115 or BSC 118; BSC 116/117 or BSC 120; BSC 300 and junior standing.

COURSE DESCRIPTION:

The course covers the comparative anatomy of animals, primarily vertebrates, with emphasis on functional aspects of morphology. The laboratory deals mainly with identifying anatomical features of several vertebrate species.

COURSE OBJECTIVES:

The objective of this course is to gain an understanding of the comparative anatomy of vertebrates and the evolutionary changes and trends in vertebrate morphology. Also, students will become familiar with the relationship between form and function, and how these two features have co-evolved with the evolution of the vertebrates. In the laboratory segment of this course you will become familiar with the basic anatomy of vertebrates, with an emphasis on the shark, salamander, and cat.

STUDENT LEARNING Outcomes:

At the completion of this course student will be able to:

- 1) Disseminate vertebrate evolution and diversity.
- 2) Explain mechanisms of organ performance.
- 3) Compare homologous structures within and among body forms.
- 4) Synthesize the adaptive interplay between form and function.
- 5) Construct scenarios of organ and structure evolution.
- 6) Illustrate and describe variation in vertebrate anatomy.
- 7) Decipher adaptive hypotheses of vertebrate morphology and physiology.

ATTENDANCE:

You are expected to attend all lectures. Exam questions will be drawn entirely from lecture material. Plus, you will be responsible for all announcements made in lecture.

EXAMINATIONS:

Two exams during the semester are tentatively scheduled for the following dates:

Exam 1 on Tuesday, February 10. This exam will cover lectures of Jan. 8 to Feb. 5

Exam 2 on Tuesday, March 24. This exam will cover lectures of Feb.12 to March 12.

The final is scheduled for Tuesday, April 28th at 8 am

TENTATIVE SCHEDULE: subject to change if necessary.

| Week | Date | Lecture Topic | Book chapters |
|------|----------|--|---------------|
| 1 | Jan. 8 | Greetings, class business, introduction, concepts & themes | 1 |
| 2 | 13 15 | Vertebrate phylogeny and origin Vertebrate systematics | 2 3 |
| 3 | 20 22 | Vertebrate systematics Integument | 3 6 |
| 4 | 27 | Skeletal tissue and skull | 7 |

| | | | |
|----|-----------------|--|-------------|
| | 29 | Skeletal tissue and skull/ Axial skeleton | 7 |
| 5 | Feb. 3 5 | Axial / Appendicular skeleton Appendicular skeleton | 8 9 |
| 6 | 10 12 | Review Exam 1 (6:00 – 8:00 pm) Muscles | 10 |
| 7 | 17 19 | Muscles Locomotion (video) | 10 4 |
| 8 | 24 26 | Biomechanics Respiratory systems | 4 11 |
| 9 | March 3 5 | Respiratory/Circulatory system Circulatory system | 11/12 12 |
| 10 | 10 12 | Feeding Feeding/Digestion | 13 13 |
| 11 | 17 19 | Spring break | |
| 12 | 24 26 | Review Exam 2 (6:00-8:00 pm) Digestion | 13 |
| 13 | 31 April 2 | Digestion / Urogenital system Digestion (DVD) | 13 14 |
| 14 | 7 9 | Urogenital system Nervous system/Special senses | 14 16/17 |
| 15 | 14 16 | Special senses Endocrine | 17 15 |
| 16 | 21 23 | Morphological adaptations Morphological adaptations/Graduate student presentation | |
| 17 | April 28 | FINAL (8:00 am) | |

BSC 500 STUDENTS:

Students enrolled in BSC 500 will in addition give a 20-30 min presentation at the end of the semester on a subject matter relating to functional morphology. Topics must be first approved by the instructor.

GRADING:

| | | |
|-----|-----|-----|
| BSC | 400 | 500 |
|-----|-----|-----|

Points available

| | | |
|----------------------|------------|------------|
| Exam 1 | 100 | 100 |
| Exam 2 | 150 | 150 |
| Final | 200 | 200 |
| Lecture presentation | | 100 |
| Lab | 300 | 300 |
| Total points | 750 | 850 |

Policy on missed exams:

If you miss one exam (not including the final) for a valid, documented reason (medical, family emergency, official university function), I will prorate the points for that missed exam based on the score of your other exam and final.

FINAL COURSE GRADE:

At the end of the semester, final grades will be assigned based upon: percentage scale (90-100% - A, 80 - 89% - B, 70-79% - C, 60-69% - D, < 60% - F) and breaks in the ranking of total points.

Disability Accommodations:

If you are registered with the Office of Disability Services, please make an appointment with Dr. Secor as soon as possible to discuss any course accommodations that may be necessary. If you have a disability but have not contacted the Office of Disability Services, please call 354-5175 or visit Osband Hall to register for services.

Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

Academic Misconduct:

All students in attendance at the University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. All acts of dishonesty in any work in this course constitute academic misconduct. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student. This includes, but is not limited to, cheating, plagiarism, fabrication of information, misrepresentations, and abetting any of the above. The Academic Misconduct Disciplinary Policy will be followed in the event that academic misconduct occurs. Student should refer to the Student Affairs Handbook which can be obtained in the Office of Student Life and Services in the Ferguson Center or online from the same office. As a student in this course, this statement means that all words on all exams must be your own.

Severe Weather Protocol:

In the case of a tornado warning (tornado has been sighted or detected by radar; sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate life saving actions. When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the National Weather Service and to follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take. The Office of Public Relations will disseminate the latest information regarding conditions on campus in the following ways:

Weather advisory posted on the UA homepage

Weather advisory sent out through Connect-ED--faculty, staff and students (sign up at myBama)

Weather advisory broadcast over WVUA at 90.7 FM

Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM

Weather advisory broadcast over WVUA 7. WVUA 7 Storm Watch provides a free service you can subscribe to that allows you to receive weather warnings for Tuscaloosa via e-mail, pager or cell phone. Check <http://www.wvua7.com/stormwatch.html> for details.

COURSE WITHDRAW:

The last day to withdraw from this course is March 18th. If you feel that you need to withdraw from this class, please speak to me prior to doing so.

Laboratory

Textbook: Fishbeck D.W. and A. Sebastiani. *Manual of Vertebrate Dissection, Comparative Anatomy*

| Week | Date | Material |
|------|--------------------|---|
| 1 | Jan. 13 & 15 | Terms, External morphology and lab safety |
| 2 | Jan, 20 & 22 | Skeletal system |
| 3 | Jan. 27 & 29 | Skeletal system |
| 4 | Feb. 3 & 5 | Exam #1 |
| 5 | Feb. 10 & 12 | Muscular system |
| 6 | Feb. 17 & 19 | Muscular system |
| 7 | Feb. 24 & 26 | Digestive/Urogenital/Respiratory systems |
| 8 | March 3 & 5 | Unique body plan |
| 9 | March 10 & 12 | Unique body plan |
| 10 | March 17 & 19 | Spring break |
| 11 | March 24 & 26 | Circulatory system |
| 12 | March 31 & April 2 | Unique body plan/Review |
| 13 | April 7 & 9 | Exam 2 |
| 14 | April 14 & 16 | Unique body plan |
| 15 | April 21 & 23 | Presentations |

LAB COMPONENT OBJECTIVES

To gain an understanding of the comparative anatomy of vertebrates and evolutionary changes and trends in vertebrate morphology, with an emphasis placed upon the shark, mudpuppy, and cat, and special attention to adaptively unique body plans.

EXAMINATIONS/PRESENTATIONS

The two exams and group presentation are each worth 100 points. The total points earned out of 300 will be added to the lecture point total for your final grade.

How to make it through this class:

- 1) **Attend Lecture and Lab!** Students who don't attend class tend to do poorly on exams. If you miss a class, make sure that you copy notes from another student. Exam questions will come largely from lectures and lab questions will come from the lab.
- 2) **Come to class prepared!** Read through the material in the book prior to the lecture on that material. It will be a lot easier for you to follow along in a lecture if you have done some reading first.
- 3) **Be attentive in class!** Listen to the lectures and take notes. Don't fall asleep, talk, or read the newspaper during lectures. Arrive at class on time! Ask questions.
- 4) **Study!** Review the material given in class and read assigned sections in your textbook. Don't wait until the last moment to cram for an exam, review the material daily.
- 5) **Understand, rather than memorize!** If you can understand the class material, then you have really learned it. Memorization is just short term and may only get you to the next exam.
- 6) **Practice testing yourself and each other!** Exam questions are short essay and fill-in-the-blanks. Think about what you would ask if you were giving the exam.
- 7) **Don't get yourself into a hole!** Keep up with the material; don't cram at the last moment for an exam. Don't wait until the end of the semester to decide to try to pass this class.