**Biol 323**  
Comparative Anatomy of the Vertebrates  
Spring 2023

Instructor: Jaap Hillenius  
RITA 213  
Tel: 953-2297  
email: hilleniusw@cofc.edu

Meeting Places:  
Rita 102 (lecture: TR 9:25 – 10:40)  
Rita 275 (Lab: W/R 13:30 – 17:30)

Office Hours:  
TR 11:00 - 12:00, or by appointment

Texts:  
edns 5-7 also acceptable  
**Walker & Homberger,** 2004. Vertebrate Dissection, 9th ed

Course Prerequisites: Biol 111/L, 112/L, 211 or 213, and 4 credit hours of Biol 300:380.  
Co-requisites: Biol 323L

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**Instructional Objectives & Student Learning Objectives**

Biol 323 is a comprehensive course on vertebrate evolution and functional morphology. This course covers both the origin and subsequent diversification of the vertebrates/craniates within the context of the phylum Chordata, and with a primary focus on the form, function and evolutionary changes of the major body systems. This course emphasizes a wide array of paleontological and neotological material, and includes dissection of at least two representative vertebrate specimens.

In this course, students will:
- demonstrate a detailed understanding of the functional anatomy of the major groups of vertebrates: why are these animals shaped the way they are, and what is the function of their parts?
- demonstrate an ability to integrate knowledge of anatomical form with understanding of both physiological function and developmental processes;
- demonstrate a thorough understanding of the evolutionary history of the vertebrates and of their organ systems: how have these animals changed over time, and as a result of what possible selective pressures?
- demonstrate an ability to identify anatomical structures in osteological and preserved specimens: you will dissect a primitive (shark) and a derived (cat) vertebrate.
- demonstrate an ability to make a reasoned reconstruction of 600 million years of vertebrate natural history.

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**Course Outline**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topic</th>
<th>Reading (Kardong)</th>
<th>Lab Topic</th>
<th>Dissection Guide (Walker)</th>
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<tbody>
<tr>
<td>01/12</td>
<td>Origin &amp; Phylogeny</td>
<td>1-211</td>
<td>(No lab in Week 1)</td>
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<tr>
<td>17</td>
<td>Axial Skeleton</td>
<td>294-324</td>
<td>Vertebrate Diversity &amp; Vertebrate Column</td>
<td>80-91</td>
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<tr>
<td>24</td>
<td>Appendicular Skeleton</td>
<td>325-371</td>
<td>Quiz 1 Limb Girdles</td>
<td>92-114</td>
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<td>26</td>
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<tr>
<td>31</td>
<td>Skull</td>
<td>241-293</td>
<td>Quiz 2 Skull (Anamniotes)</td>
<td>38-57</td>
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<td>02/02</td>
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<tr>
<td>07</td>
<td>Skull</td>
<td>&quot;</td>
<td>Quiz 3 Skull (Amniotes)</td>
<td>58-79</td>
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<tr>
<td>09</td>
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14 Musculature 372-412
16 “
21 Integument 212-240 Muscles 115-136, 144-154
23 “
28 Integument “
03/02 Lecture Midterm
07 Spring Break
09 “(No Labs)
14 Mouth & Pharynx 504-520 Quiz 5 Viscera 249-265, 273-286
16 “
21 Respiratory System 413-451 Quiz 6 Viscera (cont.)
23 “
28 Digestive System 521-545 Quiz 7 Circulatory System 290-308, 318-345
30 “
04/04 Circulatory System 452-503 Quiz 8 Circulatory System (cont.)
06 “
11 Circulatory System “
13 “
18 Urogenital System 545-592 Quiz 9 Urogenital System 346-358, 361-379
29 “
25 Nervous System 626-671 Lab Final

Final Lecture Exam: Tuesday, 2 May, 8:00 – 11:00

The Last Day to Withdraw from this course with a grade of “W:” Friday, 24 March

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<tr>
<th>Point Distribution:</th>
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<tr>
<td>Lab Quizzes: 7 @ 10</td>
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<tr>
<td>Lab Midterm: 50</td>
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<tr>
<td>Lecture Midterm: 100</td>
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<tr>
<td>Lab Final: 150</td>
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<tr>
<td>Lecture Final: 200</td>
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<td>total: 570</td>
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<tr>
<th>Grading Scale:</th>
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<tr>
<td>A &gt; 93%</td>
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<td>B’ 80 – 83</td>
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<td>B 83 – 87</td>
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<td>C’ 77 – 80</td>
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<td>C 73 – 77</td>
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<td>B’ 87 – 90</td>
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<td>D’ 60 – 63</td>
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<td>B 83 – 87</td>
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<td>C 70 – 73</td>
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<td>A 93 – 100</td>
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<td>C 73 – 77</td>
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<td>D 63 – 67</td>
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<td>E &lt; 60%</td>
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This course syllabus and certain other course materials (copies of lecture & lab handouts, etc) will be posted in the course OAKS page. Your scores on graded assessments, and midterm and final grades will also be posted in the OAKS Gradebook.

Attendance Policy

This is an in-person course: both lectures and laboratories are provided on-campus only. Although some supplementary materials may be posted in OAKS, there is no primary online content. Lectures are not recorded, and laboratories are centered on hands-on, specimen-based experiential learning. Students are therefore encouraged to regularly attend lecture and laboratory. Taking detailed notes is most strongly encouraged.

Students who miss either lecture or lab sessions for illness, medical emergency, family emergency/tragedy should contact the course instructor to report the absence. Accommodation for missed assessments may be possible with adequate notification, but due to the heavy reliance on specimens, such accommodation cannot be guaranteed. Failure to notify your instructor may result in no accommodation.

Inclement Weather, Pandemic or Substantial Disruption of Instruction: if in-person classes are suspended I will announce a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and Internet access. Resources are available to provide students with these essential tools.

Please adhere to CDC and SC DHEC Guidelines, and current CofC policies, for quarantine and isolation due to COVID-19 close-contact exposure and/or infection. This is particularly critical in the context of the dissection labs, since you will be working closely with at least one other lab partner. Your course instructor reserves the right to cancel in-person instruction and move all class activities completely online if there is a concerning incidence of COVID infections and/or exposures among students in the class. Timely notification of COVID exposure or infection impacts my ability to provide accommodations for course materials and assessments and may further impact the health of your fellow students and instructors, both in this course and across CofC.

It is my hope that you remain healthy throughout the semester, and I will attempt to provide reasonable accommodations if quarantine or isolation is necessary. However, due to the intensive focus on specimen-based/dissection-based instruction, missed laboratories are particularly difficult/impossible duplicate in an online format, and if repeated and/or extended accommodations are requested, you may be referred for a medical withdrawal from the course.

Dissecting Instruments & Gloves:

After the lab midterm, each student should have a set of dissecting instruments. Instruments from previous classes may be used, or new instruments may be purchased from commercial sources, such as the CofC or MUSC bookstores. Minimum equipment should include:

- a scalpel (with plenty of spare blades. Most useful are #10 or #22 blades, depending on scalpel handle)
- one or more blunt probes
- one sharp probe (“needle probe”)
- medium forceps (NOT tooth-type tissue forceps or fine point “needle” forceps)

Students are also expected to provide their own dissecting gloves (nitrile is recommended; latex gloves are not permitted!)

!! No Latex gloves !!
Helpful Tips:

Biol 323 is a challenging, information-dense course that integrates a number of primary biological fields: anatomy, functional morphology, comparative physiology, developmental biology, vertebrate phylogeny and paleontology. The lecture pace is often fast, and it is important to keep up or risk falling rapidly behind. Previous students have generally reviewed this course as “intensive, challenging, but also very rewarding.”

- Taking notes is strongly encouraged. For best results, consider rewriting your in-class notes asap after each lecture to generate a more comprehensive & more detailed set of notes that better capture your recollection, help you identify areas where you still have questions, and allow for better integration with handouts and your sketches.

- Draw it out! Make sketches and diagrams frequently. Drawing is not often encouraged in US learning environments, and many students have unfortunately developed some discomfort with their own drawing abilities. However, anatomy is a highly visual field of study, and drawing the things you see reinforces & summarizes what you learn, and facilitates improved learning. Some exam questions may require a sketch or diagram as part of your answer.

- Regularly review your notes, and identify any areas where you have questions. Ask those questions at the earliest opportunity. Asking questions is strongly encouraged: I always set aside a few minutes at the start of each lecture for this. The labs also are an ideal environment for this. Remember, asking questions is almost always a sign of a student’s academic strength, not their weakness.

- Spend as much time in the lab as you can spare; don’t leave early unless you are convinced you are on top of the material. You have paid for the full 4 hours of your instructor’s presence in those labs: take advantage of that investment.

- For further discussions, feel free to email me, attend my office hours, or set up an appointment.

SNAP Accommodations

The Center for Disability Services/SNAP is committed to assisting qualified students with disabilities achieve their academic goals by providing reasonable academic accommodations under appropriate circumstances. If you have a disability and anticipate the need for an accommodation in order to participate in this class, please connect with the Center for Disability Services/SNAP office. They will assist you in getting the resources you may need to participate fully in this class. You can contact the Center for Disability Services/SNAP office at 843.953.1431 or at snap@cofc.edu. You can find additional information and request academic accommodations at the Center for Disability Services/SNAP website.

Students with approved SNAP accommodations must email their instructor the Professor Notification Letter (PNL) and discuss your needs during the first week of class via email or a phone call. I want you to be successful, so please be sure to contact me! In addition, students approved to receive accommodations are responsible for contacting their instructor at least one week before any accommodation is needed. Please plan accordingly.

Academic Integrity

As members of the College of Charleston community, we affirm, embrace and hold ourselves accountable to the core values of integrity, academic excellence, liberal arts education, respect for the individual student, diversity, equity and inclusion, student centeredness, innovation and public mission. Congruent with these core values, the College of Charleston expects that every student and community member has a responsibility to uphold the standards of the honor code, as outlined in the Student Handbook. In pursuit of academic learning, you are expected to reference the work of other scholars, and complete your own academic work, while utilizing appropriate resources for assistance. Any acts of suspected academic dishonesty will be reported to the Office of the Dean of Students and addressed through the conduct process. Your adherence to these practices and expectations plays a vital role in fostering a campus culture that balances trust and the pursuit of knowledge while producing a strong foundation of academic excellence at the College of Charleston. Any questions regarding these expectations can be clarified by your instructor.
CougarAlert

The College of Charleston has an agreement with the Blackboard Connect Inc. (formerly The NTI Group, Inc. (NTI)) to use its Connect-ED communication software to provide an emergency notification system that is capable of reaching students, faculty, staff and parents within minutes of a campus crisis. This system is called CougarAlert.

Information for Students

The CougarAlert emergency notification system will contact up to six phone numbers for the student. Students may include family member numbers in their address and phone number information.

All students should log onto MyCharleston to review their address and telephone information and update as needed.

To access the address and telephone information, follow these steps:
1. Log on to MyCharleston
2. Click on the Academic Services tab
3. Click on the Banner Self-Service link in the third column
4. Click on the Personal Information link
5. Click on the Update Address and Phones and Cougar Alert link

The CougarAlert system will pull the phone number in the following order – cell, phone with text messaging option, cell phone without text messaging option, residence hall room phone number, mailing phone number, home phone number, parent phone number and parent 2 phone number.

If you do not have one of these numbers in your student record, the system will select the next number on the list. To avoid issues related to timely communication of emergency messages to the proper places, every student must update his or her contact information in MyCharleston with current accurate information.

CougarAlert Display Information

When you receive an emergency message from the College of Charleston's CougarAlert System, the return e-mail address will be displayed as cougaralert@cofc.edu, and Caller ID will be displayed as 843.725.7246 (this is the College's Emergency Information Hotline).

Testing and Implementation

Testing will be conducted each semester to verify all systems are operating properly. The campus community will be notified via e-mail and web page postings when testing of the system will be conducted.

Blackboard Connect Software

Blackboard Connect is an emergency communication software that sends notification before, during and after an emergency. With this new system, the College will be able to communicate in many modes, including voice messages to home, work and cell phones; text messages to cell phones, PDAs and other devices; written messages to e-mail accounts; and messages to teletypewriters and telecommunication devices (TTY/TDD) for the hearing impaired. In combination with our existing communications methods and emergency response plans, this new notification system will significantly enhance the College of Charleston's ability to maintain a learning environment in which students are safe, secure and comfortable.

In an emergency, communications to the campus will be issued in the following priority order:
1. Message to the Blackboard Connect Emergency Notification System (phone and e-mail).
2. Recorded message to the College’s Emergency Information Hotline, 843.725.7246.
3. Update to the Website.
4. Printed update sheets to be distributed and posted on campus (if necessary).

The CougarAlert system will only be used to notify you in the event of a campus crisis or emergency.
SAFETY POLICY AND PROCEDURES
for Biol 323 Comparative Vertebrate Anatomy

1. You are responsible for knowing the biological, chemical, electrical, ergonomic, mechanical, and physical hazards associated with the equipment and materials that are being utilized in the laboratory. Listen to all instructions and ask questions about that which you do not understand.

2. Know the location of safety equipment: telephones, emergency shower, eyewash, fire extinguisher, fire alarm pull.

3. Know the appropriate emergency response procedures. For routine incidents (minor burns, cuts, spills, etc.) call 3-5611. For serious injuries and all fires, call 911.

4. Do not work alone in the laboratory if you are working with hazardous materials or equipment.

5. Use hazardous chemicals, equipment, and biological agents only as directed and for their intended purpose.

6. Do not engage in horseplay, pranks or other acts of mischief while in lab.

7. Drinking, eating, and application of cosmetics is forbidden in the comparative anatomy lab. Smoking is forbidden in all College buildings.

8. During dissections, appropriate clothing shall be worn. The dress code for dissection laboratory work is as follows:
   a) No exposed skin on arms, legs or torso; lab coats are recommended. Safety glasses or goggles are also recommended.
   b) Gloves are required. Nitrile is recommended; latex is not permitted.
   c) Closed-toe shoes are required. The heel and top of foot must be covered. High heeled shoes, sandals, and perforated shoes are not permitted.
   d) Confine long hair and loose clothing.
   e) Remove gloves and lab coat when exiting the laboratory.
   f) Wash your hands before leaving, even if gloves were used.

9. Never remove chemicals, biological samples, or laboratory equipment from a lab without proper authorization.

10. Properly and safely dispose of all waste materials. Three distinct categories of waste are generated during dissections, and designated containers are used for each:
    a) paper, gloves, and other regular trash;
    b) dissection parts, preserved materials;
    c) sharps: used scalpel blades, broken glassware. Treat sharps and broken glass containers carefully.

11. Use good personal hygiene. Keep your hands and face clean. Wash hands thoroughly with soap and water after handling dissection or preserved materials, even if gloves were used.

12. Keep your work area clean and uncluttered. Before leaving the laboratory, you are responsible for making sure your lab area is clean and organized. Wash and stack your dissection tray, and clean & dry your table.
13. Always have your College of Charleston identification and insurance information with you when working in a laboratory. MedicAlert identification must be worn if you have any potential life-threatening chemical sensitivities or medical conditions.

14. Report any accident or injury, however minor, immediately to your instructor or teaching assistant. An accident report form must be completed and forwarded to the department chair, dean, and to the Director of Environmental Health and Safety.

If you have questions/concerns about safety in the lab please first consult your instructor. If these are not answered, please see the department chair. Finally, you may consult the Director of Environmental Health and Safety @ 843-953-6802.