BIOL 427-527 Marine Tetrapod Biology Spring 2023 Hybrid Syllabus
3-Credit Cross-Listed Undergraduate + Graduate Lecture Course

Meeting Thursday 1:00-4:00PM GML 202 / Alt Zoom via OAKS for Online Backups

Instructor: Andrew M. Shedlock
Office: Hollings Marine Lab Room H212-J
Hours: Thursdays after class (or by appointment)
Phone: N/A
G-mail: a.m.shedlock@gmail.com
OAKS: All exams, assignments, selected course material and attendance/participation in scheduled synchronous Zoom meetings will be managed using OAKS

Prerequisite(s) for Undergraduates: BIOL 111/BIOL 111L, BIOL 112/BIOL 112L, BIOL 211/BIOL 211D and permission of the instructor.

Co-requisite(s) or Prerequisite(s) for Undergraduates: None required, but undergraduate courses such as vertebrate zoology, ecology, evolution, genetics, statistics, and conservation biology are recommended.

Cross-listing in OAKS: Biol 427 is cross-listed with the graduate course BIOL 527 inside a single merged OAKS shell even though they are listed and enrolled as two separate courses by the CofC Office of the Registrar. Graduate students enrolling in BIOL 527 have additional assignments incorporating independent research project-based skill development and advanced learning outcomes as compared to undergraduates in BIOL 427, all other aspects of the class overlap and are taught synchronously to both undergraduate and graduate students.

The class uses the following textbooks; all are recommended but none are required. Texts are available online for free through the CofC library at the URL's listed below or as hardcopies on reserve at Addlestone. They are also commercially for sale as hardcopies at the CofC Bookstore or through the publisher as eBooks for lease or purchase:

https://pascal-cofc.library.cofc.edu/permalink/01PASCAL_COFC/bkrgbh/alma991010761737505613

https://pascal-cofc.library.cofc.edu/permalink/01PASCAL_COFC/bkrgbh/alma991009281129705613


1
Supplemental References On reserve in Addlestone and also the Marine Resources Library


Grading of the Course Based on 600 (undergraduate) and 900 (graduate) Point Totals

The course grade will be based on: (1) two lecture exams; (2) attendance and participation in active in-class discussion and learning activities; and (3) a written literature review report for undergraduate students (BIOL 427); a taxon-specific literature synthesis written report for graduate students (BIOL 527).

Lecture Exams: 2 X 100 = 200 Pts
Written Literature Review (BIOL 427 undergraduates) = 200 Pts
Written Literature Synthesis (Biol 527 graduates) = 300 Pts
Oral Presentation of Literature Synthesis (BIOL 527 graduates) = 200 Pts
Attendance, Participation and Discussion = 200 Pts

Letter grades will be determined by the following breakdown:

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<tr>
<th>Numerical % out of 600/900</th>
<th>CofC Letter Grade [u/g]</th>
<th>CofC Letter Grade [grad]</th>
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<tr>
<td>93-100</td>
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<td>90-92</td>
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Attendance Policy

Attendance is not optional and is essential to obtain full credit for active in-class participation in student peer-driven activities such as the oral presentation Q&A interactive in-class discussions. Accommodations for COVID-19 related issues as formally implemented by the CofC will be incorporated into the class attendance policy on a case-by-case basis in order to maximize the safety and public health of all students in the class and the instructor.

COVID-19 and Personal Health

*Masks are encouraged with social distancing for all in-person indoor class activities.*

Because of the pandemic, you will need to manage your individual health according to the many policies and student support resources being communicated to you by the CofC Admin and posted on CofC websites. Getting vaccinated and tested according to required CofC campus-wide policies based on the recommendations of the CDC and SC DHEC is critically important during the rapid spread of covid infections.

If you need help, you are not alone, so please do not hesitate to reach out to the many campus support professionals who are on standby 24/7 to give you the support you need to stay safe, healthy, and productive during this challenging time for everyone at the College. A full menu of updated policies and student support resources related to the COVID-19 pandemic can be found on the Back on the Bricks website https://cofc.edu/back-on-the-bricks/index.php. The CofC Counseling Center (https://counseling.cofc.edu/) also provides a variety of confidential health and wellness support services to make sure you can get the support you need when you need it.

Synopsis of Marine Tetrapod Biology

Over the past 300 million years vertebrates have repeatedly evolved adaptations that take advantage of the extensive estuarine and marine habitats of our planet. This course emphasizes the comparative evolutionary perspective and historical processes that have led to both the diversity and the common themes of physiological, behavioral and anatomical adaptations of amniote lineages of reptiles, birds and mammals that exploit a wide array of marine situations. We will evaluate and discuss marine tetrapods as models for advanced studies in evolution, physiology, behavior and ecology. Marine tetrapods are also important sentinels for ocean health and are the focus of much environmental law, policy, and conservation action. Special attention will be given to the faunas of the South Carolina Lowcountry and Southeast US Atlantic coastal regions. In this course we will review the research and natural history literature regarding marine tetrapods and place this literature into the context of current research priorities and needs for understanding the basic biology and conservation of these species many of which are threatened or endangered and have become iconic for their cultural and economic importance both locally and globally.
Learning Outcomes

1. To develop a solid working knowledge of the biological diversity of the marine reptiles, birds and mammals.
2. To thoroughly understand the evolutionary significance of secondary marine adaptations.
3. To evaluate the evolutionary relationships of the extinct and living marine tetrapods.
4. To learn the basics of marine tetrapod physiology, ecology, behavior, anatomy and field identification.
5. To learn the primary laboratory and field techniques for the study of marine tetrapods.
6. To appreciate the wide diversity of conservation issues related to marine tetrapods.
7. To cultivate skills in critical thinking, communication, team collaboration, and creative problem solving using an integrative hypothesis-driven scientific framework drawn from active review, oral presentation and interactive discussion of the primary literature.
8. [Graduate only] Learn how to develop multidisciplinary investigative strategies and arguments for advancing basic and applied research on marine tetrapods through the design and production of a written review and synthesis of the primary literature for a major marine tetrapod lineage chosen from a comprehensive list of marine tetrapod taxa provided.
9. [Graduate only] Learn how to develop effective communication strategies and arguments for advancing basic and applied research on marine tetrapods through synthesis and oral presentation of major findings from the individual term paper assignment in a professional research symposium format.

Format

Standard 2.5 hour class format will be: announcements and approximate 1-hour lecture, 15-minute break, video presentations or student presentations and group discussion, or continued lecture. Lectures will be either in-person at GML 202 or at a specific alternate site visit, or online via Zoom in order to address pandemic safety issues. Lectures cover the major topics of marine tetrapod natural history and conservation in an inquiry-based mixed-media visual and analytical format promoting peer-driven active learning approaches using case examples illustrated by the literature, textbooks, and video documentaries. Students will be challenged to think scientifically in a hypothesis driven framework and to think synthetically and creatively about applying fundamental concepts to solve modern real-world problems in marine science and environmental biology. Undergraduates will select readings from a large online library of marine tetrapod peer-reviewed scientific literature and associated popular media coverage of published research and prepare written scientific summary reports on chosen references. At the end of the course there will be a student-driven symposium where graduate students will present oral summaries and lead interactive group discussions of their full-semester written literature synthesis assignment to a predominantly undergraduate audience of classmates.
LECTURE SCHEDULE

Text Abbreviations: MME (Berta et al., Marine Mammal Evolution); MB (Schreiber and Burger, Marine Birds); ST (Spotilla, Sea Turtles); VL (Pough et al., Vert Life)

JAN 12
Introduction to the class, review of syllabus and assignments.
What do we mean by “Marine” + “Tetrapods” (Part 1)?
The Great Transitions: Amniote diversity and tetrapod adaptations
Refs: VL Ch. 4, 10, 12; MB Ch. 6; VL Ch. 10; ST Ch. 1-4

JAN 19
What do we mean by “Marine” + “Tetrapods” (Part 2)?
The Great Transitions: Amniote diversity and tetrapod adaptations
Refs: VL Ch. 4, 10, 12; MB Ch. 6; VL Ch. 10; ST Ch. 1-4

JAN 26
Guest Lecture, Prof Emeritus Dave Owens, CofC Biology Department
Hindsight in 2023: 40 years of sea turtle research
Refs: VL Ch. 16; ST Ch. 5, 10; plus provided by guest

FEB 2
Field Trip: Dr. Jeffrey Schwenter, SC DNR Sea Turtle Conservation Program
Hands-on Necropsy Dissections for SC DNR Sea Turtle Stranding and Rescue Program
Meets outdoors at Fort Johnson, exact location TBA

FEB 9
Guest Lecture, Dr. Thomas Rainwater, Clemson Baruch Institute
Crocodilian ecology evolution and conservation
Refs: VL Ch. 18; plus provided by guest

FEB 16
Dino-avian diversity and the paraphyly of marine forms
Refs: VL Ch. 19, 21; MB Ch. 1, 3, 18, 19

FEB 23
Guest Lecture, Melissa Chaplin, USF&W Biologist
Marine shorebird life history and conservation
Refs: VL Ch. 21, 22; plus provided by guest

MAR 2
EXAM 1

MAY 9
SPRING BREAK
MAR 16
**Field Trip:** Mace Brown Museum of Natural History, SSMB
Guest Lecture, Dr. Bobby Boessenecker, Department of Geology
Whale origins and evolution, paleodiversity of marine reptiles
Refs: MME Ch 4, 10, 11, 12; plus provided by guest

MAR 23
Cetacean diversity, ecology and conservation
Refs: MME Ch. 4, 6, 7-13

MAR 30
**Field Trip:** Hollings Marine Laboratory, Fort Johnson
Guest Lecture, Dr. Wayne McFee, NOAA
Cetaceans as sentinels for environmental health and conservation
Refs: MME Ch. 14, 15; plus provided by guest

APR 6
Genomics and cetacean diversity
Refs: Selected case studies from the primary literature

APR 13
Graduate Student Project Symposium
**Oral presentations** and class-wide discussion wrap-up

APR 20
EXAM 2

MAY 4
**Final Written Reports Due** by Email to A.M.Shedlock@gmail.com
APPENDIX I: Mandatory Syllabus Content

Honor Code and Academic Integrity
http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php
Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Students may have the opportunity to meet with the Dean of Students and may be brought before the Honor Board. Depending on the severity, incidents may lead to a written intervention, a XF in the course indicating failure of the course due to academic dishonesty, disciplinary probation, suspension (temporary removal) or expulsion (permanent removal) from the College by the Honor Board. Students should be aware that unauthorized collaboration—working together without permission—is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others’ exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Academic Integrity Statement (3.12):
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.

Accommodations for Students with Disabilities (3.11):
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. 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.

OAKS (3.10, for all instructional modalities)
OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials and grades for each assignment, which will be regularly posted.

Inclement Weather, Pandemic or Substantial Interruption of Instruction
If in-person classes are suspended, faculty will announce to their students 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.