

Syllabus Fall 2023: Mammalogy (EBIO 4760/5760; MUSM 5760)

Description: This is a lecture and lab course with the goal of providing a foundational understanding of the study of mammals. The lecture and lab will cover the origin, evolution, adaptation, biogeography, physiology, ecology, behavior, and taxonomy of mammals of the world, NA, and Colorado. The lab uses mammal skins, bones, and/or tissues. The prerequisites include the General Biology Lecture Courses (EBIO 1210 & 1220) or equivalent. This is an upper division course—we will delve much deeper into the subject matter and require a larger time-commitment to comprehend the material fully.

Instructor: **Dr. Christy M. McCain**
Professor in EBIO & Curator of Vertebrates
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Office: Museum Collections/Bruce Curtis E190C
Office Hours: Monday 10 am-noon or by appointment

Teaching Assistants: **Sara Padula**
Ecology & Evolutionary Biology Graduate Student
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Sara's Office: Ramaley C287
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William Anderson
Ecology & Evolutionary Biology Graduate Student
Will's Email: wian6764@colorado.edu
Will's Office: Ramaley C287
Will's Office Hours: Friday noon-2 pm or by appointment

Lecture: MWF 9:05-9:55am

Lecture Location: Ramaley N183

Labs: Tuesday 2-4:50 pm [Sara], Thursday 9:30am-1220 pm [Will], or Thursday 2:00-4:50 pm [Will]

Lab Location: Museum Collections/Bruce Curtis Bldg: MCOL E280

Required Items:

- (1) **Mammalogy Lab Manual**—available at printing cost in lab (~\$25; 215 pages)
- (2) **iClicker Cloud**—free; sign up and link iClicker+ to a iClicker Student App account (see below)

Highly Recommended Items:

- (1) **Mammalogy: adaptation, diversity, and ecology.** Feldhamer, Drickamer, Vessey, Merritt, and Krajewski. John Hopkins Press. 4th edition (3rd edition okay) [**FDR**; Cheap used copies available on Amazon; copy on reserve in CU library; some chapters available on our Canvas page]
- (2) **Peterson Field Guide to Mammals of North America**, 4th edition. Reid, F. 2006. Houghton Mifflin Harcourt Press [ebook available at CU Library].

Other good mammalogy sources:

Animal Diversity Web. (<http://animaldiversity.ummz.umich.edu/site/accounts/information/Mammalia.html>).
Armstrong, D. M., J. P. Fitzgerald, and C. A. Meaney. 2011. Mammals of Colorado. Denver Museum of Nature and Science, and University of Colorado Press.

Borror, D. 1960. Dictionary of Word Roots. Mayfield Publishing Co.
Jones, J. K., Jr., and R. W. Manning. 1992. Illustrated key to skulls of genera of North American land mammals. Texas Tech University Press, Lubbock.
Lawlor, T. E. 1979. Handbook to the orders and families of living mammals. Mad River Press, Arcata.
Vaughn, T. A., J. M. Ryan, and N. J. Czaplewski. 2009. Mammalogy, 5th edition. Jones and Bartlett Pub.

Course Schedule: A preliminary schedule of lectures and labs is attached. Lecture and lab topics and dates are subject to change. Optional reading assignments for each week of lecture (based on FDR 4th edition) and lab are specified.

iClickers: To encourage students to participate in the lecture material, **iClickers accounts are required** and various numbers of lecture questions and points will be available each day for a total of ~50 points across the semester. You will need to create an iClicker Student App account (<https://oit.colorado.edu/tutorial/cuclickers-set-iclicker-reef-student-account>) and link your clicker to the App account (https://oit.colorado.edu/tutorial/cuclickers-add-iclicker-remote-id-student-account?utm_source=tutorial/cuclickers-add-iclicker-remote-id-reef-student-account&utm_campaign=redirect) in order for your clicker grade to be counted into our gradebook. You will also need to register for our course in the Student App (https://oit.colorado.edu/tutorial/cuclickers-using-iclicker-student-app-class?utm_source=tutorial/cuclickers-using-iclicker-reef-class&utm_campaign=redirect), and link your App account to Canvas. Information on how to do this is located on the CUClickers Student Resources page (https://oit.colorado.edu/services/learning-spaces-technology/cuclickers-iclickers/help/student-resources?utm_source=services/learning-spaces-technology/cuclickers/help/student-resources&utm_campaign=redirect). There is also a youtube video for setting up your clickers: https://www.youtube.com/watch?v=9KWQv_d7icQ. Our classroom has limited wifi capabilities (poor rating). Therefore, I recommend you purchase and use a physical iClicker for class. You may even be able to check one out from the Norlin circulation desk for the semester, on a first-come, first-served basis. If you choose to use the iClicker student app on your phone or computer, keep in mind that you may experience connection issues, and we cannot be held responsible for these lost points. **Please set up your iClicker on the app BEFORE you get to class.**

Labs: It should be obvious that attendance at the lab sections is essential. You can probably find a way to work around missing an occasional lecture, but labs cannot be made up once the week is over and the specimens have been put away. If you must miss your assigned lab during some week due to illness, attend the exam review session for access to miss material. Because labs are so important in this class, we do keep track of attendance. **Five points will be subtracted from your final grade for every lab missed.**

Exams: There will be 2 lecture exams, a final exam, and 3 lab exams; none are cumulative, but each does build upon the previous sections. Each exam is worth 100 pts for undergraduates. Lecture exam questions will be fill-in the blank, short answers, and paragraph form. Each exam will include additional, advanced questions for graduate-level students only (EBIO 5760) worth an additional 25 pts.

Mammal Observations: Most mammals are hard to see since they are small and nocturnal. However, some can be seen during the day or with a little bit of effort and luck. Mammal observations are required. There are 14 species and 3 signs to document as observed and correctly identified using a camera with date/time imbedded with accompanying selfie with same date/time to insure it was your observation. These are due at various points across the semester (i.e., 5 in Sept.; 6 in Oct.; and 6 in Dec.). More information on these observations is available on the class website. There is also a competition for who can observe the most Colorado mammals (those more difficult to see) with digital observation beyond

the required species and signs. There will be extra credit for 1st (20 pts), 2nd (10 pts), and 3rd place (5 pts) winners!

Grading: As a rule-of-thumb, grades will be awarded as follows: 90-100% = A; 80-89% = B; 70-79% = C; 60-69% = D; below 60% = F. Borderline cases = “+” & “-”.

<u>Activity:</u>	<u>Undergrad Level (4760):</u>	<u>Graduate Level (5760):</u>
Lecture Exams (100 pts each)	200 points	250 points
Lab Exams (100 pts each)	300 points	375 points
Final Exam	100 points	125 points
Mammal Observations	51 points	51 points
iClicker Participation	50 points	50 points
Graduate Project:	--	100 points
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Total	701 points	951 points

Graduate Project (EBIO 5760 only): 100 points. Graduate students will meet as a group with Dr. McCain the second week of classes and discuss possible projects (solitary or group versions). Then, after the group decision of the project(s), we will set a timeline for progress and deadlines.

Syllabus Statements

Diversity, Equity and Inclusion

The diversity of students, faculty, and staff are critical to our educational mission. I expect all students in this class to actively contribute to an inclusive, anti-racist, respectful and equitable culture. Diversity is defined as *“the variety of similarities and differences among people, including but not limited to: gender, gender identity, ethnicity, race, native or indigenous origin, age, generation, sexual orientation, culture, religion, belief system, marital status, parental status, socio-economic difference, appearance, language and accent, disability, mental health, education, geography, nationality, work style, work experience, job role and function, thinking style, and personality type. Inclusion of various diversity dimensions may vary by geography or organization.”*¹ Inclusion is defined as *“a dynamic state of operating in which diversity is leveraged to create a fair, healthy, and high-performing organization or community. An inclusive environment ensures equitable access to resources and opportunities for all. It also enables individuals and groups to feel safe, respected, engaged, motivated, and valued, for who they are and for their contributions toward organizational and societal goals.”*¹ An anti-racist is someone who *“...is supporting an antiracist policy through their actions or expressing antiracist ideas. This includes the expression or ideas that racial groups are equals and do not need developing and supporting policies that reduce racial inequity.”* Equity is defined as *“fair and accessible treatment, involvement, and support for the diversity of people. Equity does not involve equal or the same distribution of resources across all populations, rather strategic distribution based on closing achievement, engagement and persistence/retention “gaps” by removing barriers for full participation.”*³

1-[The Centre for Global Inclusion](https://centreforglobalinclusion.org/downloads/), <https://centreforglobalinclusion.org/downloads/>

2-Ibram X Kendi, How to be an Antiracist, Random House, 2019

3-Amy E. Moreno, Director of Inclusive Culture – CEAS, CU Boulder

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation, or political philosophy. For more information, see the [classroom behavior policy](#), the [Student Code of Conduct](#), and the [Office of Institutional Equity and Compliance](#).

Requirements for Infectious Diseases

Members of the CU Boulder community and visitors to campus must follow university, department, and building health and safety requirements and all public health orders to reduce the risk of spreading infectious diseases.

The CU Boulder campus is currently mask optional. However, if masks are again required in classrooms, students who fail to adhere to masking requirements will be asked to leave class. Students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct & Conflict Resolution. Students who require accommodation because a disability prevents them from fulfilling safety measures related to infectious disease will be asked to follow the steps in the "Accommodation for Disabilities" statement on this syllabus. **Additionally, in our Mammalogy labs we have two additional requirements for protection of students and mammal specimens, including (1) no food and drink in the classroom, including water (if you need to drink, take a drink outside, not inside, the building); and (2) the optional use of nitrile gloves (provided) when handling specimens.**

For those who feel ill and think you might have COVID-19 or if you have tested positive for COVID-19, please stay home and follow the [further guidance of the Public Health Office](#). For those who have been in close contact with someone who has COVID-19 but do not have any symptoms and have not tested positive for COVID-19, you do not need to stay home.

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

[Disability Services](#) determines accommodations based on documented disabilities in the academic environment. If you qualify for accommodations because of a disability, submit your accommodation letter from Disability Services to your faculty member in a timely manner so your needs can be addressed. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance.

If you have a temporary medical condition or required medical isolation for which you require accommodation, please let Dr. McCain or your lab TA know asap. Please ask classmates for notes and/or review lecture and lab slides on Canvas for days missed. Also see [Temporary Medical Conditions](#) on the Disability Services website.

Basic Needs Statement

In order to learn, students need to have met their basic needs: food and a safe place to live. If you are having trouble with either, the campus provides some [helpful resources](#). Reach out of basicneeds@colorado.edu to connect with food resources. If you are having trouble paying for rent or facing housing insecurity, you can contact Mediation Services at 303-441-4364 or mediation@boulder.colorado.edu, and Off-campus Housing at 303-492-7053 or och@colorado.edu. A [Student Emergency Fund](#) exists to support students experiencing temporary financial hardship. Other

campus resources are available, including mental health resources and free counseling at [CAPs](#). Please don't hesitate to contact Dr. McCain or one of your TAs if you have trouble negotiating these resources.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: honor@colorado.edu, 303-492-5550. Students found responsible for violating the [Honor Code](#) will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit [Honor Code](#) for more information on the academic integrity policy.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email cureport@colorado.edu. Information about university policies, [reporting options](#), and support resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of incidents related to these policies regardless of when or where something occurred. This is to ensure that individuals impacted receive an outreach from OIEC about their options for addressing a concern and the support resources available. To learn more about reporting and support resources for a variety of issues, visit [Don't Ignore It](#).

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, **please let the instructor know 2 weeks ahead** if you will be missing a lab or lecture exam for rescheduling at another time. See the [campus policy regarding religious observances](#) for full details.

Class Content Usage

The materials presented in this class in any form from text to video and online to in-person are only for the use in our class. My written permission is required to share these materials outside of the CU Mammalogy 2023 learning environment.

DAY	MAMMALOGY LECTURE	READINGS*	WED/THURS LAB
8/28	What is Mammalogy & Why Do We Care?	Lect: FHR 1-4	Mammal Lab Introduction, Osteology and Observations
8/30	What is a Mammal?	Lab: Manual Intro & 1 & pgs 216-225	
9/1	Mammal Traits II		
9/4	LABOR DAY – NO CLASS	Lecture: FHR 4 skim Part 3	Prototheria & Metatheria
9/6	Mammalian Systematics	Lab: Manual 2, FHR 12	
9/8	Mammal Orders I		
9/11	Mammal Orders II	Lecture: FHR skim Part 3	"Insectivora", Macroscelidea, Scandentia, Xenarthra, Pholidota, Tubulidentata
9/13	Mammal Orders III	Lab: Manual 3, FHR 13, 16	
9/15	Mammalian Evolutionary History I		
9/18	Mammalian Evolutionary History II	Lecture: FHR 4- 5	LAB EXAM I (100 pts) Observations (n = 5) due 9/18
9/20	Mammalian Evolutionary History III	Lab: Manual 1- 3, FHR 12-13, 16	
9/22	Historical Biogeography of Mammals I		
9/25	Historical Biogeography of Mammals II	Lecture: FHR 5- 6, PDFs	Dermoptera, Chiroptera, Primates
9/27	Pleistocene Megafaunal Extinction	Lab: Manual 4, FDR 13-15	
9/29	LECTURE EXAM I (100 pts)		
10/2	Ecological Biogeography of Mammals I	Lecture: FHR 6, 26-27, PDFs	Rodentia & Lagomorpha
10/4	Ecological Biogeography of Mammals II	Lab: Manual 5, FHR 18	
10/6	Ecological Biogeography of Mammals III		
10/9	Mammalian Abundance I	Lecture: FHR 7	Carnivora, Hyracoidea, & Sirenia
10/11	Mammalian Abundance II	Lab: Manual 6, FHR 17, 19	
10/13	Finish: Population Biology		
	*FHR readings listed for Edition 4; Edition 3 slightly different		

DAY	MAMMALOGY LECTURE	READINGS*	WED/THURS LAB
10/16	Mammalian Adaptations: Size & Shape	Lecture: FHR 7-8 Lab: Manual 7, FHR 19-21	Proboscidea, Perissodactyla, Cetartiodactyla
10/18	Mammal Stances & Locomotion Variation		
10/20	Locomotion: Skeletal Adaptation I		
10/23	Locomotion: Skeletal Adaptation II	Lecture: FHR 11, 9 Lab: Manual 4-7, FHR 13-15, 17-21	REVIEW LAB Observations (n = 6) due 10/23
10/25	Mammalian Reproduction		
10/27	Mammalian Thermoregulation & Metabolism		
10/30	Adaptations to the Cold I	Lecture: FHR 9-10 Lab: Manual 4-7, FHR 13-15, 17-21	LAB EXAM II (100 pts)
11/1	Adaptations to the Cold II		
11/3	Adaptations to the Cold III		
11/6	Adaptations to the Heat I	Lecture: FHR 9-10 Lab: Manual 8, Peterson Guide	COLORADO MAMMALS I
11/8	Adaptations to the Heat II		
11/10	LECTURE EXAM II (100 pts)		
11/13	Echolocation I: Bats	Lecture: FHR 14 & 21 Lab: Manual 9, Peterson Guide	COLORADO MAMMALS II
11/15	Echolocation II: Adaptations & Habitat		
11/17	Echolocation III: Cetaceans		
11/20	FALL BREAK: No Classes		
11/22			
11/24			
11/27	Social Behavior I	Lecture: PDFs, FHR 22-24 Lab: Manual 10, Peterson Guide	COLORADO MAMMALS III
11/29	Social Behavior II		
12/1	Social Behavior III		
	*FHR readings listed for Edition 4; Edition 3 slightly different		

	MAMMALOGY LECTURE	READINGS*	WED/THURS LAB
12/4	Mammalian Conservation I	Lecture: FHR 24-25	REVIEW LAB Final Observations (n = 6) due 12/4
12/6	Mammalian Conservation II	Lab: Manual 8-10, Peterson Guide	
12/8	Mammalian Conservation III		
12/11	Mammals & Climate Change	Lecture: FHR 30, PDFs	FINAL LAB PRACTICAL (100 pts)
12/13	Review Day	Lab: Manual 8-10, Peterson Guide	
12/15	No class: READING DAY		
12/20	FINAL EXAM (Wednesday 730-10 pm)	Lecture classroom	