INTRODUCTION:

Welcome to Biology 447. Mammalogy is the science of the study of mammals. The main objective of this course is to gain an understanding of the biology of mammals, including their evolution, systematics, behavior, physiology, and ecology. You will become familiar with mammals, their characteristics, some of their unique biology, and you will develop skills that will enhance your career opportunities (please see course objectives below). I view my role and that of your TA as facilitators – this means that you are primarily responsible for learning and integrating the material that we present. We will do our best to guide you through the material and help you develop critical thinking skills and a life-long love for learning, using mammals as exemplars. I will do my best to make class time interactive. Please do your part by preparing for class, attending class regularly and participating actively. This is a course that I thoroughly enjoy teaching and it is my hope that you want to enjoy and understand the material as well. Two textbooks (Vaughn et al. – Mammalogy; and Ryan – Mammalogy Techniques Manuel) are recommended but not required. However, there is a course prerequisite for this class: Biology 220A (Animal Biological Diversity) and this is a requirement for participating in this course.

INSTRUCTORS:

D. S. Rogers, 647B WIDB (422-5898) and 340 MLBM (422-5491). Office hours are Tuesdays from 1:00 – 2:00 p.m. (647 WIDB) or by arrangement. My email address is: Duke_Rogers@byu.edu *

* Email is for emergencies, setting up an appointment, or for questions with very short answers. The first line in your message should include the course number and the subject of your email. Including these will facilitate my ability to answer your question more expeditiously. Please only ask questions that require brief answers via email and ask complex questions after lecture or schedule an appointment with me.

Ana Laura Almendra, Teaching Assistant. The laboratory syllabus will be available the first week of the semester and will contain contact information.

TEXTBOOK, READINGS, OTHER ASSIGNMENTS AND SITES:


Specific topics and corresponding readings to be announced during the semester. Copies will be provided.
Information/tutorials available on the World Wide Web. Here are some useful links:

Animal Diversity Web: [http://animaldiversity.ummz.umich.edu/site/index.html](http://animaldiversity.ummz.umich.edu/site/index.html)
Mammalian crania archive:
http://1kai.dokkyomed.ac.jp/mammal/en/mammal.html
Mammalogy on the Internet:
http://faculty.baruch.cuny.edu/jwahlert/biblio/
Mammal Species of the World:
[http://www.bucknell.edu/msw3/](http://www.bucknell.edu/msw3/) (this is a really good site for species-level information)
The Tree of Life Web Project: [http://tolweb.org/tree/](http://tolweb.org/tree/)
Bibliography of General Works in Mammalogy:
http://faculty.baruch.cuny.edu/jwahlert/biblio/index.html
UCMP Hall of Mammals: [http://www.ucmp.berkeley.edu/mammal/mammal.html](http://www.ucmp.berkeley.edu/mammal/mammal.html)
National Museum of Natural History, The Smithsonian
[http://www.mnh.si.edu/collections.html](http://www.mnh.si.edu/collections.html)
Tree of Life, University of Arizona - phylogenetic relationships, characteristics of mammalian taxa: [http://phylogeny.arizona.edu/tree/home.pages/popular.html](http://phylogeny.arizona.edu/tree/home.pages/popular.html)
Museum of Vertebrate Zoology, UC Berkeley: [http://mvz.berkeley.edu/](http://mvz.berkeley.edu/)

**OBJECTIVES:**

1. Become familiar with the biology of mammals, including their origin, evolution, zoogeography and adaptive radiation.
2. Be able to identify the majority of mammals to the level of family using primarily skull characters.
3. Be able to identify the majority of Utah mammals to species using primarily skin/external characters.
4. Develop skills necessary to identify selected mammalian genera by sight (skin and/or skull) though use, in part, of dichotomous keys.
5. Participate in field-related research activities.
6. Develop skills in scientific communication and assessment, particularly through reading original literature and a research project.
7. Increase experience in applying the scientific method using mammals as exemplars.
8. Continue to develop critical thinking skills and abilities to work collaboratively.
COURSE POLICIES AND REQUIREMENTS:

Lecture Overview
This course is worth three credits. It meets on Tuesday-Thursdays from 9:00 to 9:50 p.m., with a lab section: either 2:00 – 5:00 p.m. or 5:00 – 8:00 p.m. on Wednesdays. Students are expected to attend ALL class sessions and class participation is a component of your grade. Many lectures will be supplemented from the primary literature (scientific journals) or sources other than textbooks. These additional assignments will be communicated to you primarily via Learning Suite, so please check this site regularly. Writing assignments will be given during class and many of these assignments will be based on material (usually PowerPoint presentations and/or assigned readings) that you will review before coming to class. Therefore, if you miss class, you may miss an opportunity to turn in a writing assignment and this will have a negative impact on your grade. Of course, you will be responsible for obtaining notes and information from your classmates for any missed classes.

Course Policy
Students are expected to behave ethically and responsibly as scholars, and to behave reasonably in the classroom. All of your work must be your own (see Academic Honesty below), unless you are specifically requested to work in groups and submit a single group assignment. In all your work, you must cite the sources of the ideas you present, and use your own words in writing. I encourage you to talk to me about any problems that you have with the way your work is evaluated.

Use of Electronic Devices
If you use a computer, tablet or phone in class it must be used only for purposes relevant to the course. All cell phones and other noisy devices are to be turned OFF or to a silent setting. Cell phone usage, texting, IM-ing, tweeting, checking email, etc. is not allowed at any time during class. You will be given a reminder for the first violation, a second violation will result in a 20 point deduction from the total course points (1000 point maximum), a third violation will result in 50 points deducted from your grade and you will no longer be allowed to use electronic devices in my class.

Academic Honesty
I view the issue of academic honesty very seriously. BYU’s Honor Code calls for students to “be honest”. Please refer to BYU’s handbook if you have concerns or questions regarding this policy. By participating in this course, each student agrees not to cheat or represent someone else’s work as your own (plagiarism). This is especially true for writing assignments that you work on outside of class. This includes the use of unauthorized books, notebooks, or other sources in order to secure or give help during an assignment, the unauthorized copying of examinations, assignments, reports, or term papers, or
the presentation of unacknowledged material as if it were your own work. Any student that I find to be academically dishonest will receive an E grade for this course. Remember: *We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men. . . . If there is anything virtuous, lovely, or of good report or praiseworthy, we seek after these things.* - THIRTEENTH ARTICLE OF FAITH

**Field Trips**

I will provide you with sign-up sheets for field trip participation. There will be two Thursday afternoon through Saturday afternoon field trip, one the middle of September (13th – 15th) and the second in October (18th – 20th). I will also organize several shorter trips to more local areas the first half of the semester, but these do not replace the overnight trips. Shorter trips will require that you travel to a field site and set traps in the afternoon (ca. 3:00 p.m. to 7:00 p.m. and then pick up the traps that we set early the following morning (ca. 7:00 a.m. to 11:00 a.m.). Participating in field trips likely will mean that it will overlap with another course. I will provide you with documentation about the field trips to your other professor(s) upon request. It is a course requirement that you participate in at least 2 field trips and that one of these is an overnight trip. However, if you feel that you cannot meet this requirement, please withdraw from this class. During these field trips you will gain hands-on experience with fieldwork associated with the discipline of Mammalogy including live and snap trapping small mammals, recording data and writing in a journal. List of gear and equipment recommended for the field trips will be provided.

**Personal Risks Associated With This Course**

Because you may have the opportunity to work with both live and preserved mammals as part of this class, there will be associated risks, particularly with any field component. Risks include, but are not limited to, exposure to communicable diseases, injury as a result of specimen handling, and riding in University vehicles. Ana and I will make every effort to minimize your exposure to hazards. If you have concerns about participating in any of the exercises in this class, I will make other options available to you so that you can meet all course requirements. You will be asked to sign a waiver of liability prior to participating in certain class exercises. Additional information about this will be provided in class.

**Course Overview**

Biology 447 has two main components. The lecture portion will emphasize knowledge of various mammalian taxa and mammalian evolution, behavior, physiology and ecology. The laboratory portion will be a mixture of identification labs and fieldwork. Material in the lecture and laboratory portions of the course will overlap in content, but not necessarily in organization.
**Instructional Activities**

Two lecture sessions will be conducted each week (see schedule below). A major portion of the course is laboratory and fieldwork. You will be given written and/or oral instructions for each activity. A majority of the laboratory work will involve study and identification of museum specimens. Fieldwork will focus on techniques for collecting and studying live mammals. You are responsible for all assigned readings in both lecture and lab. You are also responsible for learning the assigned laboratory information and techniques. Lastly, you are responsible for maintaining a field notebook and journal. Attendance and participation in field activities is required.

**Research Project:** Each student is required to design, conduct, and present an original research project, in conjunction with a student partner. The research project is to focus on a scientific question of your choosing that relates directly to the study of mammals. The project must incorporate use of technology in the field or laboratory.

The first requirement for your project is submission of a written proposal of your research (due dates for this project will be uploaded to Learning Suite). The following sections must be included in your proposal: Introduction (background information based on primary literature, justification of your research, and an explicit statement of your research question), hypotheses (if appropriate), methods including statistical analyses to be conducted, significance of research, and literature cited. You must use at least five primary references that relate closely to your proposed research. Follow the format in the *Journal of Mammalogy* for the Literature Cited section. A reader should be able to replicate your research based on the methods that you present in your proposal.

The second requirement for your research project is that you and your partner conduct the research, with modifications as needed (and approved by me), and that you make an oral presentation of your research. The presentation has a time limit of 10 minutes followed by 2 minutes for questions. Both group members must participate in the presentation. You must also provide me and your classmates with a written copy of an abstract of your research (150-word limit; see *Journal of Mammalogy* for examples) prior to your presentation. You will also need to submit an image of your research team, via e-mail, to me. Your presentation will be evaluated in the following areas: abstract, style, content, visual aids, and ability to answer questions. The textbook entitled "Measuring and Monitoring Biological Diversity" explains how to design and conduct many types of studies of mammals.

**Graduate Students:** Students taking the course for graduate credit are expected to conduct a more in-depth research project compared with that of the undergraduate students. Please see me for instructions on these requirements.

**Examples of Kinds of Research Projects (adapted from J. Thomas):**

- Special Collection, with accompanying journal and catalog:
• Examples: plaster casts of mammal tracks, photographic collection of mammal signs (burrows, nests, runways), skull collection, whole animal voucher specimens, cassette recordings of mammals sounds, slides of mammals in art or sculpture.

• Video Documentary:
  • Video presentation on some aspect of Mammalogy. For example, evolutionary history of mammals, mating behavior of river otters, diet of kit foxes, or parental care of long-tailed voles.

• Research:
  ◦ Develop a question and hypothesis and design a scientific study to answer that question. Make an oral presentation of your research using Power Point or other presentation software.
    ▪ Do red squirrels prefer a certain type of tree for building nests? Design a study to census squirrel nests and types of trees.
    ▪ What is the size and design of a pocket gopher’s tunnel system? Design a study to document the extent of tunnel systems.
    ▪ Which species of mammals use railroad track areas? Conduct a survey for mammal signs along railroad tracks.
    ▪ Are carnivores attracted to one scent over another? Make different types of bait to determine the attractiveness of different baits.
    ▪ Which mammal species are known to occur in Wasatch County? Conduct a literature review together with records from natural history museums to document occurrences.
    ▪ What species are involved with road (or railroad) kills? Conduct a survey of road kill mammals.

• Mammalian Species Account:
  ◦ Prepare a Species Account in the format of the Animal Diversity Web. Species Accounts must be for a species that has not yet been summarized on the Animal Diversity Website. You will need to do library research, read other Species Accounts, learn the terminology, and then summarize the material for your account.

Writing Assignments

I believe that all students benefit from developing their writing skills. Writing will help you assimilate and understand course material. In reality, writing is key to any scientific discipline. It is the means by which researchers communicate their latest finding, ideas, or arguments. “I am never as clear about any matter as when I have just finished writing about it” (James Van Allen). The writing process also will improve your grade! (Writing Matters, The BYU Newsletter on Writing Across the Curriculum, October 1999). Most importantly, becoming a good (or better) writer will help you professionally in terms of employment. I will require you to write in this course, and your peers, the teaching assistant, or myself will critique a portion of what you compose.

Occasionally I will ask you to prepare a commentary on the PowerPoint presentation, the assigned readings or an assignment covering the topic of discussion for the day’s lecture material. Some of these assignments will be unannounced - you will not know when they will occur. They will be written either at the beginning, during, or at the end of the class period. I will provide you with the question(s), then you will write a response. Typically, time will be limited to about 10 minutes to prepare your narrative for the unannounced writing assignments. Some of these questions will be read and evaluated by your peers.
Not all these assignments will be graded, but all in class writing will count toward your class participation grade. Therefore, you should try to do your best with each assignment and again, regular class attendance is key.

**Examination Set-up**

The mid-term exams will consist of multiple choice, matching, short answer, and essay type questions (see writing section below). **All questions will come from lecture material (PowerPoint presentations and class discussions) or will be taken from other assigned readings.** The mid-term exams will be administered in the testing center (see lecture schedule below). Students who miss a mid-term exam must have a University approved excuse for doing so or they will receive a grade of zero. If you have an excuse for missing a mid-term exam, you will be required to take a comprehensive final that will substitute for the missed mid-term. Those students who have taken all three mid-term exams and are “satisfied” with their grades need not take the final exam. However, if any student wants to try and improve their grade, the comprehensive final can substitute for one of the three mid-term grades.

**Assessment**

All writing assignments and the midterm exams will be graded and returned to you as quickly as possible. After the mid-term exam has been returned and an exam key has been posted on Learning Suite, you will have **one week** to check your paper for grading accuracy and turn in a request for a re-grade if necessary. Please follow the format on the “Biology 447: Re-grade Policy and Submission Form” available on Learning Suite. No exams will be accepted for re-grades after the one-week period. However, if you schedule an appointment with me, I will be happy to discuss your exams with you at any time during the semester.

**Course Grade**

Your grade will be determined by your performance on three midterm exams, in class writing assignments and a semester-long research/writing assignment as well as the laboratory portion of this course for a total of 1000 points with a breakdown as follows:

- Three midterm exams: 100 points each; 300 points total
- In class writing assignments: 10 – 50 points each; 150 points total
- Research project: 150 points total; point breakdown forthcoming
- Lab Portion of course: 400 points total; see lab syllabus for breakdown of points

The comprehensive final is optional, so if you choose to take the final exam it will replace one of the mid-term exam grades.

Grades will be based on the standard university scale (e.g. 92.5% or higher A; 90-92.5% A-, 87.5 – 90% B+, 82.5 – 87.5% B, 80-82.5% B-, etc.).

*There will be no opportunity for additional or extra credit.*
**Reasonable Accommodation**
Any student in this class who has a disability that may prevent you from fully demonstrating your abilities should contact me personally as soon as possible so that we can discuss accommodations/alternatives necessary to ensure full participation and facilitate your educational development.

**Last But Not Least**
Although I view this course syllabus as a contract between instructor and students, I reserve the right to modify the syllabus as necessary and will do my best to communicate these changes to you in a reasonable and timely manner.

**LECTURE SCHEDULE**

Lectures may get behind or ahead, but assignment due dates and exam dates will NOT change. If you miss class, contact a class member and ask to copy their notes.

<table>
<thead>
<tr>
<th>Week Number/Date</th>
<th>Suggested Readings in Vaughn et al.</th>
<th>Lecture Topics</th>
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<tbody>
<tr>
<td>1st Week 27 Aug.</td>
<td>Chapters 1, 3</td>
<td>Introduction, mammal evolution/characteristics</td>
</tr>
<tr>
<td>2nd Week 3 Sept.</td>
<td>Chapters 2, 4</td>
<td>Mammalian characteristics, prototherian mammals</td>
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<tr>
<td>3rd Week 10 Sept.</td>
<td>Chapters 5, 6</td>
<td>Metatherian mammals</td>
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**First Mid-term Exam will be available in the Testing Center (Mon. Sept. 24th – Wed. Sept. 26th).** Covers lecture material and other assignments from weeks 1 - 4).

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<th>Suggested Readings in Vaughn et al.</th>
<th>Lecture Topics</th>
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<tbody>
<tr>
<td>5th Week 24 Sept.</td>
<td>Chapter 10</td>
<td>Dermoptera and Chiroptera</td>
</tr>
<tr>
<td>6th Week 1 Oct.</td>
<td></td>
<td>Chiroptera (continued)</td>
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<tr>
<td>7th Week 8 Oct.</td>
<td>Chapters 11, 9, 15</td>
<td>Xenarthra, Pholidota, Tubulidentata, Primates</td>
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LECTURE SCHEDULE (Continued)

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<tr>
<th>Week Number/Date</th>
<th>Topics</th>
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<tbody>
<tr>
<td>8th Week 15 Oct.</td>
<td>Chapters 13</td>
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<td></td>
<td>Cetacea</td>
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Second mid-term exam will be available in the Testing Center (Wed. Oct. 24th - Fri. Oct. 26th). Covers lecture material and other assignments from weeks 5 - 8).

| 9th Week 22 Oct. | Chapter 14                  |
|                 | Proboscidea, Hyracoidea, Sirenia |

| 10th Week 29 Oct. | Chapters 18, 19              |
|                  | Lagomorpha and Rodentia      |

| 11th Week 5 Nov. | Rodentia (continued)         |
|                 |                               |

| 12th Week 12 Nov. | Chapters 16, 17              |
|                  | Carnivora, Ungulates         |

Third mid-term exam will be available in the Testing Center (Sat. Nov. 17th as well as Mon. and Tues. Nov. 19 and 20th). Covers lecture material and other assignments from weeks 9 - 12).

| 13th Week        | THANKSGIVING HOLIDAYS!!      |
|                 |                               |

| 14th Week 26 Nov. |                          |
|                  | Student Presentations     |

| 15th Week 3 Dec. |                          |
|                  | Student Presentations     |

Final Exam: Scheduled for Thursday, 13 December, 7:00 – 10:00 a.m. in class for anyone interested in taking the exam.