ANIMAL COMMUNICATION BIO 438L
Unique Numbers 50190, 50195 (SPRING 2011)

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***Course Synopsis*:** The objective of the course it to understand animal communication. To do so, we must become familiar with its physical principles, sensory and morphological mechanisms, behavioral function, and evolution. The emphasis is on integrating information from different areas of biology to make this understanding as general as possible.

The first half of the course will address the general principles of communication in each sensory modality, while the second half will address various topics concerning the behavior, ecology, and evolution of communication systems. The laboratory exercises will emphasize quantitative analysis of signals and experimental studies of animal communication. The laboratory schedule is below.

***Lectures*:** Tuesday, Thursday 11:00-12:30 PM, RLM 6.112

***Labs*:** Monday or Wednesday 8:00-11:00, Brackenridge Field Lab rm 114.
UT shuttle (LA route) leaves Whitis and 21st St, by the fountain on the UT campus, at 7:36 AM and arrives at 7:55 AM at BFL. The laboratory will end at 10:30, in time to catch the 10:35 shuttle, which leaves from in front of BFL, to reach campus by 10:55.
Shuttle to BFL: *http://www.utexas.edu/parking/transportation/shuttle/index.html*

***Textbook (recommended*):** *Principles of Animal Communication*. J.W. Bradbury & S. L. Vehrencamp, Sinauer and Associates, Sunderland MA (~$93). There is a new edition of this book being published in May 2011. Therefore, the publisher is not selling any copies of the available edition. There are, however, used numerous copies available on *Amazon.com*, as low as $64. A copy is on reserve in the Life Sciences Library (MAI).

I-Clickers: I-clickers will be used during the lecture portion of the class. These will be used for short quizzes (graded), and for assessing understanding of the lecture material in real-time (ungraded). I-clickers can be purchased from the University Co-op. There are used I-clickers available for lower cost. Please be sure that you purchase the "I-clicker", and not one of the other, available interactive devices. You must register your I-clicker in Blackboard.

***Grading*:** Half of the grade is based on the lecture portion of the course and half on the lab. There are two lecture exams, dates are given below. The lecture portion of your grade is grade is derived equally for the two exams and from the in-class quizzes and

participation. The final exam is an oral exam. The requirements for the lab and the independent project are detailed below. The various short lab assignments are worth a combined 20% of the final grade and the independent project is worth 30% of the final grade (more details on the independent project below).

Points are deducted for any assignments handed in late.

Absences: If a student misses the exam they must contact the instructor or TA within 24 hours of the exam and provide of note from a medical doctor in order to take a makeup exam. If a student anticipates missing a lab, they can switch to the other lab for that week only with prior permission from the TA. If a student has a medical excuse (and note) for missing a lab, every attempt will be made to have the student make up that lab.

***Class Web Site*:** We will use *Blackboard*. Lectures will be presented in power point format and made available on the web. Laboratory material, including the lab exercises, problem sets, etc., will also be on the web site. You must register your I-clicker in Blackboard.

Lecture Schedule

Most of the topics addressed will also be covered in the textbook. The textbook, however, goes into far more detail and covers more topics than possible in a one semester undergraduate course. For each lecture, I will assign the relative pages to be read in the textbook and I will distribute an outline of that day's lecture.

Week	Dates	Topic
1	1/18, 1/20	Introduction, Properties of Sound [sound tutorial]
2	1/25, 1/27	Signal Transmission/Degradation, Signal Contrast
3	2/1, 2/3	Properties of Light
4	2/8, 2/10	Sound Production, Hearing
5	2/15, 2/17	Visual Signal Production, Vision
6	2/22, 2/24	Information Theory & Bayesian Updating
7	***3/1***, 3/3	***Exam,*** Song learning
8	3/8, 310	Communicating with Kin, Bee-Human Dance-Language
	3/15 – 3/17	*Spring Break*
9	3/22, 3/24	Eavesdroppers, Communication Networks
10	3/29, 3/31	Communicating to Predators, Reference & Language
11	4/5, 4/7	Hormones & Communication
12	4/12, 4/14	Signal Evolution, Signal Evolution
13	4/19, 4/21	Signal Coevolution, Neural Networks
14	4/26, 4/28	Signal Honesty, Human Mate Preferences
15	5/3, 5/5	Reserved for Catching Up!!
Final Exam Week		***Final Exam***

Animal Communication Lab

Place and Time: The lab meets on Monday/Wednesday from 8-11 AM. The labs will be at Brackenridge Field Station (BFL), located at 2907 Lake Austin Blvd. Lab will end by 10:30 AM to allow you to take the UT Shuttle to be back on campus by 10:55 AM.

Sound Tutorial: There is a Sound Tutorial which is both on the computers at BFL and on the class website where it can be downloaded. You are required to work through this tutorial in week 1, in lieu of lab that week. This tutorial will aid both in the first few labs and in the lectures on acoustic properties of sound.

Sound Ruler: This is the program we use to analyze sounds. It is on the lab computers and it can be downloaded free of charge from *http://soundruler.sourceforge.net/main/*. Also in lieu of lab in week 1, you should download Sound Ruler from its web site and the Sound Analysis lab from the website. This lab describes the basic use of Sound Ruler. You should be familiar with the operation of Sound Ruler before the lab for week 2.

Field trips: There will be several field trips in addition to the weekly labs. Students will receive extra credit for attending. These on scheduled on an *ad hoc* basis due to constraints of weather.

Introduction: The goal of lab in the first half of the semester is to provide a general overview of some of the tools use in studies on animal communication. The last half of the semester is devoted to independent projects. Small groups of students (usually 2) will develop projects with the help of the professor and the TA. Students should be considering potential projects as we are learning different techniques in the first half of the lab. Although the labs are biased towards acoustic and visual communication, projects working with other sensory modalities or techniques are welcome.

Attendance at all lab sessions is required, and switching between sessions (Monday /Wednesday) without previous approval is not allowed. If a student misses a lab they must contact the TA and provide a note from a medical doctor. (The same is true for exams.) Students that have missed a lab with a valid excuse will do the lab on their own if possible or a makeup assignment where the lab is not possible . Attendance during the presentations of independent projects is obligatory, and everybody must stay to hear all the presentations.

The lab manuals will be available on Blackboard. You should read the appropriate section of the manual before each class in order to know what materials to bring, and to be familiar with objectives of that day.

You will need an EID account for using the computers during the lab. You were assigned one of these accounts when you entered UT, be sure that you remember your username

and password. If you need help with the information of your account contact the Biological Sciences Computer Support Facility at *help@bscsf.utexas.edu*

Equipment Check-Out Procedure: Send an email to the TA specifying what you need, and when you want to use it. The TA will email you back and telling you when you can get the equipment. Since the equipment is stored at the lab in BFL it is best to get equipment while you are out there or lab. The equipment is limited and some can be in short supply, especially by the end of the semester. So plan ahead and reserve the equipment in advance if you need to use it on specific days. Check out time will depend on how many people are working with it.

Independent project: The project should be on animal communication. In general, we discourage projects on pets and humans (as well as pet humans). Your independent project is your opportunity to expand your interest in particular aspects of the class. The projects will be developed individually or in small groups (no more than 2 students). With the help of the professor and the TA you will build a research plan achievable during the second half of the semester. Students may not use the independent study for another course. Graduate students may not c onduct independent studies that will be part of their thesis project.

Grade: Lab reports sum up to the 20% of the final grade.

Your independent project is 30% of your final grade for the class. The grade for your project includes your performance on the presentations (3) and your final paper (see below).

Attendance during the presentations of independent projects is obligatory, and everybody must stay for all presentations.

For the presentations, you will use Power Point.

Proposal Topic: You should discuss your idea of a proposal with the TA and/or the professor. The TA must approve your topic for the proposal and you must give her a short written explanation of your idea (< 1 p) by week 7 (Mon: Feb 28/Wed: March 2). Save the written proposal topic as it will need to be handed in with the final project.

We strongly suggest you begin thinking about the project immediately and do not wait until the last week to the proposal topic approved. Anyone wishing to work with vertebrates must get permission as early as possible and adhere to animal care (IACUC) policies.

Project proposal: Week 9, March 21/23. Power Point presentation, 10 min max. Give an introduction to the topic you chose for your project, present your question, and explain why this is a relevant study in animal communication. The background information you give should be relevant to frame your question and/or predictions. T hen, state the methodology that you will use. Be specific, give details about your protocol and include

the sample size that you are planning to achieve. Save the power point presentation as it will need to be handed it with the final project.

Preliminary results: Week 12, April 11/13. Presentation, 10 min max. A full introduction is not necessary for this presentation, just briefly remind us of your question and your methods. At this point you need to present sufficient data to demonstrate that the projec t is tractable. If you are having problems with the project (i.e. the animals you were planning to study are not as responsive as you thought they would be), mention these difficulties and also try to suggest solutions. If your project is proving intractab le, meet with the TA or professor before the presentation about changing the project, and present the proposal of your new project instead of the preliminary results. Save the power point presentation as it will need to be handed it with the final project.

***Final Presentation*:** Week 15, May 2/4. Presentation: a 15 min max power point presentation and a paper is due the day of your presentation. Give a full presentation of your project including introduction, methods, results and discussion.

For the final project you must submit the following : (i) the written paper; (ii) On a CD: (a) the proposal topic document, (b) the written paper (thus you submit both a hard copy and a digital copy of the final paper), and (c) the three power point presentations: project proposal, preliminary results and final presentation.

Some hints for your presentations:

Do not present big tables with small letter. Try to present your data in graphs.
Include pictures, diagrams and sounds that can help you explain your point.
Try to avoid slides with full text in small letter. Summarize your ideas in short phrases that the audience can easily follow.
Relate your findings to the general introduction you presented in the initial proposal.

Laboratory Schedule

Week	Dates	Topic	Assignment
1	1/17, 1/19	No lab meeting, Download Sound Tutorial & & Sound Ruler w/ instructions for using it	(i) Complete Sound Tutorial (ii) Learn how to use SoundRuler
2	1/24, 1/26	Sound Recording & Analysis	
3	1/31, 2/2	Sound Degradation	Lab report due from week 2
4	2/7, 2/9	Cardinal Playbacks	Lab report due from week 3
5	2/14, 2/16	Visual Contrast	Lab report due from week 4
6	2/21, 2/23	Spectrophotometer	Lab report due from week 5

7	2/28, 3/2	Fish Olfactory Signals	Lab report due from week 6 Project Topic Proposal Due
8	3/7, 3/9	"Catch-up Lab"	
	3/14 – 3/18	*Spring Break*	
9	3/21, 3/23	Independent project proposal (presentation)	
10	3/28, 3/30	Work on Independent Projects	
11	4/4, 4/6	Work on Independent Projects	
12	4/11, 4/13	Preliminary results - Independent project (presentation)	
13	4/18, 4/20	Work on Independent Projects	
14	4/25, 4/27	Work on Independent Projects	
15	5/2, 5/4	Independent Project Final (paper and presentation)	