

ANIMAL COMMUNICATION (BIOL 32) Spring 2016

INSTRUCTOR:	Hannah ter Hofstede
OFFICE LOCATION:	Life Sciences Building 026
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OFFICE PHONE:	646-8830
OFFICE HOURS:	Tue 1:15-2:00, Thu 1:00-2:00
CLASS MEETINGS:	Mon Wed Fri 10:00-11:05, LSC 205
X-HOURS:	Thu 12:00-12:50. Please keep these times available for course related activities, including unscheduled lecture sessions as needed.
PRE-REQUISITES	One of Bio 12-16 or Psyc 6

COURSE DESCRIPTION

This is an intermediate level course that will examine how and why animals have evolved to communicate with one another. The study of animal behavior, and communication in particular, is interdisciplinary because it integrates information about the physics of the signals to which animals respond, the neural basis of signal detection and processing, and the evolutionary mechanisms that can influence communication in animals. Course material will be delivered in lectures, articles and discussions throughout the term. Please see the schedule for dates and topics of lectures and discussions.

LEARNING OUTCOMES

By the end of this course, students should be able to:

- Explain the main reasons why animals communicate with each other and describe specific contexts.
- Demonstrate a basic understanding of the physics and neurobiology underlying communication using different sensory modalities.
- Demonstrate a fundamental understanding of the evolutionary processes involved in shaping animal communication.
- Apply this knowledge to make logical inferences about mechanistic or evolutionary processes involved in animal communication.
- Describe how the scientific method is used to gain knowledge, including the roles of hypotheses, predictions, and experimental design.
- Critically read and evaluate the primary literature in the field of animal communication and effectively communicate these ideas both verbally and in writing.
- Write a report demonstrating an in-depth understanding of a specific topic in animal communication with an effective synthesis of the scientific literature.

COURSE MATERIALS AND RESOURCES

Text book: Bradbury, JW and Vehrencamp, SL (2012) *Principles of Animal Communication, 2nd ed.* Sinauer Associates; Sunderland, Massachusetts. The text book is not required, but it can be helpful as a supplementary source of information and alternative format for understanding lecture material.

Companion website for the text book: <http://sites.sinauer.com/animalcommunication2e/index.html>

Here you can find the "web topics" and a list of the references cited in the textbook.

Canvas Materials: The Canvas website for this course will include the Powerpoint slides of the lectures, additional reading materials such as articles for discussions, and instructions for assignments.

HONOR PRINCIPLE

During this course it is expected that students will abide by the Honor Principle. The Dartmouth College Student Handbook (page iii) states "Fundamental to the principle of independent learning are the requirements of honesty and integrity in the performance of academic assignments, both in the classroom and outside. Dartmouth operates on the principle of academic honor, without proctoring of examinations. Students who submit work which is not their own or who commit other acts of academic dishonesty forfeit the opportunity to continue at Dartmouth." Students are encouraged to discuss course material with classmates in preparation for tests and class discussions. Students must not give or receive help during exams and discussion questions and the independent project must be the results of the student's own independent work, not the result of a collaborative effort with others.

STUDENT NEEDS

Academic Skills Center: <http://www.dartmouth.edu/~acskills>

Research Center for Writing, and Information Technology: <http://www.dartmouth.edu/~rwit>

Student Accessibility Services: <http://www.dartmouth.edu/~accessibility>

Students with disabilities enrolled in this course and who may need disability-related classroom accommodations are encouraged to make an appointment to see me before the end of the second week of the term. All discussions will remain confidential, although the Student Accessibility Services office may be consulted to discuss appropriate implementation of any accommodation requested.

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the term to discuss appropriate accommodations

EVALUATION

Evaluation will be based on four in-class quizzes, five class discussions of the primary literature, and an independent project. Missed quizzes, discussions and presentations will receive a grade of zero. Late assignments, including components of the independent project, will be penalized at 10% per day. Exceptions will only be made for serious illness or a family emergency, and alternate arrangements should be made in advance. See class schedule below and the Canvas website for due dates.

Quizzes (4 x 15% each, 60% of final grade): There will be four in-class quizzes throughout the term, each worth 15% of the final grade. Each quiz will consist of short answer questions. Although the quizzes will focus on the material covered since the previous quiz, much of the information from earlier components in the course will be incorporated into the increasingly integrative material later in the course. In this sense, the quizzes will be cumulative.

Literature Discussions (5 x 3% each, 15% of final grade): Five class periods will consist of class discussions of review articles and original research papers on major topics in animal communication. An assignment worth 2% of the final grade will be due at the start of class on discussion dates and participation in each discussion will be worth 1% of the final grade. Detailed instructions for discussion assignments and participation will be available on the Canvas website.

Independent Project (25% of final grade): A presentation and written analysis of a problem or question in animal communication of the student's choosing will be submitted at the end of the course. The project will have five components, three of which will be evaluated for the final grade: statement of research question, first draft of paper outline, paper outline (5% of final grade), presentation (5% of final grade), and written report (15% of final grade). Detailed instructions for each component will be available on the Canvas website.

COURSE SCHEDULE:

DATE	TOPIC	READINGS
Mon 3/28	Lec 1: Course Introduction / What is communication?	B&V Chap. 1
Wed 3/30	Lec 2: The Nervous System: signal detection and recognition	
Thu 3/31	Lec 3: Decision making	B&V Chap. 8 & 9
Fri 4/1	Class discussion 1 (3%): Information	Rendall et al. 2009 Seyfarth et al. 2010
Mon 4/4	Lec 4: The scientific method and primary literature	
Wed 4/6	Lec 5: Functions and contexts of communication	
Thu 4/7	Review session 1	
Fri 4/8	Quiz 1 (15%)	
Mon 4/11	Lec 6: Acoustic signals	B&V Chap. 2 & 3
Wed 4/13	Lec 7: Visual signals Submit Statement of Research Question for Independent Project	B&V Chap. 4 & 5
Thu 4/14	X-hour	
Fri 4/15	Class discussion 2 (3%): Multimodal signaling	Higham & Hebets 2013 Secondi et al. 2015
Mon 4/18	Lec 8: Chemical signals	B&V Chap. 6
Wed 4/20	Lec 9: Short-range modalities	B&V Chap. 7
Thu 4/21	Review session 2	
Fri 4/22	Quiz 2 (15%)	
Mon 4/25	Lec 10: Evolutionary origins of signals / receiver psychology	B&V Chap. 10
Wed 4/27	Lec 11: Reproduction 1 Submit First Draft of Independent Project Outline	B&V Chap. 12
Thu 4/28	Lec 12: Reproduction 2	B&V Chap. 12
Fri 4/29	Class discussion 3 (3%): Sensory exploitation	Shaw 1995 Proctor 1992
Mon 5/2	Lec 13: Social signals	B&V Chap. 13
Wed 5/4	Lec 14: Communication networks	B&V Chap. 15
Thu 5/5	Review session 3	
Fri 5/6	Quiz 3 (15%)	

COURSE SCHEDULE (con't):

DATE	TOPIC	READINGS
Mon 5/9	Lec 15: Conflict resolution	B&V Chap. 11
Wed 5/11	Lec 16: Interspecific communication and eavesdropping Submit Final Independent Project Outline (5%)	B&V Chap. 14
Thu 5/12	X-hour	
Fri 5/13	Class discussion 4 (3%): Honesty	Zahavi 1975 Dawkins & Guilford 1991
Mon 5/16	Lec 17: Human communication	B&V Chap. 16
Wed 5/18	Lec 18: Language	
Thu 5/19	Review session 4	
Fri 5/20	Quiz 4 (15%)	
Mon 5/23	Independent Project presentations (5%)	
Wed 5/25	Independent Project presentations (con't)	
Thu 5/26	Independent Project presentations (con't)	
Fri 5/27	Class discussion 5 (3%): Communication in other organisms Submit Written Report of Independent Project (15%)	Heil & Karban 2009 Keller & Surette 2006

GRADING SCHEME:

Grades in this course will follow the Dartmouth College Scholarship Ratings, as posted on the website of the Office of the Registrar: http://www.dartmouth.edu/~reg/transcript/grade_descriptions.html (see table below).

Grade	Description	Grade Point Values
A	<ol style="list-style-type: none">1. Excellent mastery of course material2. Student performance indicates a very high degree of originality, creativity, or both3. Excellent performance in analysis, synthesis, and critical expression, oral or written4. Student works independently with unusual effectiveness	A: 4 A- : 3 2/3
B	<ol style="list-style-type: none">1. Good mastery of course material2. Student performance demonstrates a high degree of originality, creativity, or both3. Good performance in analysis, synthesis, and critical expression, oral or written4. Student works well independently	B+: 3 1/3 B: 3 B-: 2 2/3
C	<ol style="list-style-type: none">1. Acceptable mastery of course material2. Student demonstrates some degree of originality, creativity, or both3. Acceptable performance in analysis, synthesis, and critical expression, oral or written4. Student works independently at an acceptable level	C+: 2 1/3 C: 2 C-: 1 2/3
D	<ol style="list-style-type: none">1. Deficient in mastery of course material2. Originality, creativity, or both apparently absent from performance3. Deficient performance in analysis, synthesis, and critical expression, oral or written4. Ability to work independently deficient	D: 1
E	<ol style="list-style-type: none">1. Serious deficiency in mastery of course material2. Originality, creativity, or both clearly lacking3. Seriously deficient performance in analysis, synthesis, and critical expression, oral or written4. Cannot work independently	E: 0