



BBE 305

Animal Communication

S1 Day 2015

Dept of Biological Sciences

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General Information

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Credit points

3

Prerequisites

39cp including BBE200

Corequisites

Co-badged status

Unit description

Communication underpins all social behaviour. Research on animal signalling provides insights into sensory processes, decision making and the factors determining success or failure in the struggle to reproduce. This unit reviews major current issues in the study of animal communication, taking a broadly integrative approach to cover evolution, development, function, and mechanism. Topics include: channels of communication; sensory systems; evolutionary origins; design features of language and communication systems; the problem of intentionality; manipulation; and deception.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

Identify the processes involved in signal evolution

Identify the major factors influencing signal design.

Describe the general principles pertaining to the form and function of signals involved in mate attraction/courtship, social integration, conflict resolution, predator avoidance, foraging, and auto-communication

Cogently evaluate, synthesize, assess and critique animal communication scientific literature - in a written summary and in a class discussion.

Use computer sound analysis programs make spectrograms and power spectra of calls and measure acoustic characteristics of animal vocalizations including: fundamental frequency, duration, peak frequency, number of harmonics. Also, differentiate between tonal and atonal sounds using bandwidth measures.

Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.

Generate testable hypotheses, design an experiment, collect and analyze the data and present written conclusions and, in an oral presentation, synthesise and communicate your findings.

Assessment Tasks

Name	Weighting	Due
<u>Mid-semester test</u>	20%	3 April
<u>Article Summary</u>	5%	13 March
<u>Final Exam</u>	40%	4 June
<u>Oral presentation</u>	10%	22 May
<u>Written Report</u>	15%	22 May ??
<u>Animal Communication Exp</u>	10%	27 March
<u>Group Discussions</u>	0%	6 March

Mid-semester test

Due: **3 April**

Weighting: **20%**

This is a multiple-choice and short answer exam covering material in the first half of the course including material covered in the practicals and outside readings posted on iLearn.

On successful completion you will be able to:

- Identify the processes involved in signal evolution

- Identify the major factors influencing signal design.
- Describe the general principles pertaining to the form and function of signals involved in mate attraction/courtship, social integration, conflict resolution, predator avoidance, foraging, and auto-communication

Article Summary

Due: **13 March**

Weighting: **5%**

You will write a 2-page (double-spaced) article summary with critique on an article you select regarding animal communication. The article will be a primary resource from a scientific journal. This exercise will help you become familiar with the literature and contribute to your critical reading and writing skills. Specific guidelines and assessment criteria are posted on iLearn.

On successful completion you will be able to:

- Cogently evaluate, synthesize, assess and critique animal communication scientific literature - in a written summary and in a class discussion.
- Use computer sound analysis programs make spectrograms and power spectra of calls and measure acoustic characteristics of animal vocalizations including: fundamental frequency, duration, peak frequency, number of harmonics. Also, differentiate between tonal and atonal sounds using bandwidth measures.
- Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.

Final Exam

Due: **4 June**

Weighting: **40%**

The final exam (worth 40% of your mark) will be held ON THE LAST LECTURE DAY WHICH IS 4 JUNE – IN THE LECTURE ROOM DURING THE 2-HOUR LECTURE PERIOD. The format of the exam will be nearly identical to the midterm exam (but longer) with multiple choice and short-answer questions.

On successful completion you will be able to:

- Identify the processes involved in signal evolution
- Identify the major factors influencing signal design.
- Describe the general principles pertaining to the form and function of signals involved in mate attraction/courtship, social integration, conflict resolution, predator avoidance, foraging, and auto-communication

Oral presentation

Due: **22 May**

Weighting: **10%**

You will present your own animal communication research project findings to your peers using power-point slides during the practical. This exercise is designed to help you develop your communication skills and ability to synthesize and present material. You are also expected to attend these presentations and ask questions. More details will be posted on iLearn

On successful completion you will be able to:

- Use computer sound analysis programs make spectrograms and power spectra of calls and measure acoustic characteristics of animal vocalizations including: fundamental frequency, duration, peak frequency, number of harmonics. Also, differentiate between tonal and atonal sounds using bandwidth measures.
- Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.

Written Report

Due: **22 May ??**

Weighting: **15%**

You will write a formal report in the style of a scientific research article on the design and findings of your independent animal communication research project. This report will have sub-sections entitled: Abstract, Introduction, Materials and Methods, Results, Discussion, and References. It will also have at least one figure. More details will be posted on iLearn

On successful completion you will be able to:

- Identify the processes involved in signal evolution
- Identify the major factors influencing signal design.
- Cogently evaluate, synthesize, assess and critique animal communication scientific literature - in a written summary and in a class discussion.
- Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.
- Generate testable hypotheses, design an experiment, collect and analyze the data and present written conclusions and, in an oral presentation, synthesize and communicate your findings.

Animal Communication Exp

Due: **27 March**

Weighting: **10%**

In multiple practical sessions you will develop a hypothesis, predictions, methods, and conduct the sound analysis required to address a question regarding animal communication. This exercise improves your skills in hypothesis development, data collection using audio/video recording, and you will learn how to use computer sound analysis software.

On successful completion you will be able to:

- Describe the general principles pertaining to the form and function of signals involved in mate attraction/courtship, social integration, conflict resolution, predator avoidance, foraging, and auto-communication
- Generate testable hypotheses, design an experiment, collect and analyze the data and present written conclusions and, in an oral presentation, synthesise and communicate your findings.

Group Discussions

Due: **6 March**

Weighting: **0%**

In a practical session, you will discuss a previous assigned research article on animal communication with your colleagues and the tutor. You will submit three questions/observations on the article that you will be asked to raise as a point of discussion.

On successful completion you will be able to:

- Identify the processes involved in signal evolution
- Identify the major factors influencing signal design.
- Describe the general principles pertaining to the form and function of signals involved in mate attraction/courtship, social integration, conflict resolution, predator avoidance, foraging, and auto-communication
- Cogently evaluate, synthesize, assess and critique animal communication scientific literature - in a written summary and in a class discussion.

Delivery and Resources

Unit completion requirements

Students must receive a final mark of >50% in order to pass this subject.

Each week you should:

- Attend lectures, take notes, ask questions
- Attend the practical session
- Read the outside reading posted on iLearn

- Work towards completing your FIELD PROJECT and oral presentation

Use iLearn for:

- Checking announcements;
- Downloading lecture materials;
- Downloading reference materials;
- Downloading readings;
- Checking your grades;
- Discussing a topic relative to animal communication with your classmates.

How do you log in? The URL login page is: <http://learn.mq.edu.au/>.

If you are having trouble accessing your online unit due to a disability or health condition, please go to the Student Services Website at <http://www.campuslife.mq.edu.au/campus-wellbeing> for assistance.

Assignment submission

All assignments must be handed in TO YOUR TUTOR DURING YOUR REGULAR PRACTICAL SESSION. We will not use the Science Centre.

Extensions and penalties

10% of the mark allocated for the assignment will be deducted per day that any work is submitted late.

The deadlines for assignments are not negotiable. Only a medical certificate or a letter with appropriate supporting documents outlining other serious, extenuating circumstances can be used to submit an assignment after the due date without penalty. All applications for special consideration or extension must be sought *before the due date* unless this is absolutely impossible. **All applications for extensions of deadlines must be submitted to the subject convenor (Clarke)**

Returning assessment tasks

Assessment tasks will be marked by tutors and returned during the practicals.

Unit materials

The recommended (but not required) textbook for this unit is:

Bradbury, J. W. and Vehrencamp, S. L. 2011. Principles of Animal Communication.

Sinauer.

The text is available from the Co-op bookshop on campus.

Unit Schedule

Week	Lec Date	Lecture	Prac Dates	Prac Activity	Linked Learning & Grad	Assess
1	26 Feb	Communication Venues & Modes	27 Feb	NO PRAC but discussion papers assigned for next prac – see iLearn		
2	5 Mar	Signal Evolution	6 Mar	Discussion papers and communication diversity examples. Article summary assigned.	L: 4 G: 1-4,6	
3	12 Mar	Auditory Signals: Propagation, Reception	13 Mar	Hypotheses & predictions Part 1: Fish audience effect/eavesdropping. Article summary due.	L: 7 G: 1-4	5% article summary
4	19 Mar	Visual Signals: Production, Propagation	20 Mar	Hypotheses & predictions Part 2: Fish audience effect/eavesdropping.	L: 7 G: 1-4	
5	26 Mar	Chemical Signals: Production, Transmission, Reception	27 Mar	Submit Figures and Results for Parts 1 & 2 of Fish audience effect/eavesdropping. Learn hands-on Spectrogram analyses.	L: 3,4,7 G: 1,3,5	10% fish results: figures and results
6	2 Apr	Mid-semester Exam in Classroom	3 Apr	NO PRAC - holiday	L: 1-3 G: 1-4	20% midterm exam
7	23 Apr	Exam Feedback	24 Apr	Learn hands-on field recording techniques and commence field project	L: 5,6 G: 1-3,5,6	
8	30 Apr	Guest Lecture	1 May	Field Recording of Avian Vocalisations with tutor assistance for field project	L: 5,6 G: 1-3,5,6	
9	7 May	Territorial and Agonistic Signals	8 May	Field Recording of Avian Vocalisations with tutor assistance for field project	L: 5,6 G: 1-3,5,6	
10	14 May	Signature Characteristics	15 May	In prac assistance with recording analysis and data presentation		

11	21 May	Environmental Signals	22 May	Presentations of field projects. Written reports for all students due. Attendance points.	L:5-7 G: 3,4,6	25% for field project presentation and report
12	28 May	Conservation and Animal Communication	29 May	Presentations of field projects continued. Attendance points.	L:5-6 G: 3,4,6	
13	4 June	Final Exam 4 June 12:05-2:00 PM Come to the lecture classroom E7B 164 with pencils and erasers/ rubbers to sit final exam.	5 June		L:1-3 G:1-4	40% for final exam

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Identify the processes involved in signal evolution
- Identify the major factors influencing signal design.
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- Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.
- Generate testable hypotheses, design an experiment, collect and analyze the data and present written conclusions and, in an oral presentation, synthesise and communicate your findings.

Assessment tasks

- Mid-semester test
- Article Summary
- Final Exam
- Oral presentation
- Written Report
- Animal Communication Exp
- Group Discussions

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Identify the processes involved in signal evolution
- Identify the major factors influencing signal design.
- Cogently evaluate, synthesise, assess and critique animal communication scientific literature - in a written summary and in a class discussion.
- Generate testable hypotheses, design an experiment, collect and analyze the data and present written conclusions and, in an oral presentation, synthesise and communicate your findings.

Assessment tasks

- Mid-semester test
- Article Summary
- Final Exam
- Written Report
- Animal Communication Exp
- Group Discussions

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Identify the major factors influencing signal design.
- Cogently evaluate, synthesize, assess and critique animal communication scientific literature - in a written summary and in a class discussion.
- Use computer sound analysis programs make spectrograms and power spectra of calls and measure acoustic characteristics of animal vocalizations including: fundamental frequency, duration, peak frequency, number of harmonics. Also, differentiate between tonal and atonal sounds using bandwidth measures.
- Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.

Assessment tasks

- Mid-semester test
- Article Summary
- Final Exam
- Oral presentation
- Written Report
- Group Discussions

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with

knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcome

- Demonstrate competence in collecting avian vocalizations using recording equipment and appropriate recording methodology.

Assessment tasks

- Article Summary
- Oral presentation
- Written Report

Changes from Previous Offering

Two new practical experiments have been added in which we will study the 'audience effect' and 'eavesdropping' in signaling behaviour in fish.