BBE 306

Neuroethology

S2 Day 2014

Dept of Biological Sciences

Contents

General Information

Unit convenor and teaching staff
Unit Convenor
Andrew Barron
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Other Staff
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9-5

Credit points
3

Prerequisites
39cp including (BBE200 or BIOL208 or BIOL246 or BIOL257 or PSY236)

Corequisites

Co-badged status

Unit description
This unit is a high-level unit in which students engage directly with research and primary scientific papers to explore the latest findings about the biological basis of behaviour. Topics include: how genes and genomes control behaviour; the neural basis of behaviour; the mechanisms of learning and memory; the evolution and biological basis of instinct; and the extent to which our behaviour is determined by our biology.

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:

Explain patterns of nervous system evolution

Explain the complexities when relating behavioual phenotypes to the genome

Source primary scientific literature to research an essay on

Generate hypotheses, and design new experiments to test hypotheses

Execute a small independent scientific project.

Present experimental findings as a paper written in the style of a recognised scientific journal

Present a research project orally

Critique, review and discuss primary scientific papers

General Assessment Information

Assignment description

Short answer questions (ungraded)

This is a self-assessed exercise. Following the lectures in week 2 students will be given 2 short answer questions of the style you can expect in your final exam. You should prepare answers to these, and model answers and a marking guide will be posted on iLearn in week 3. The intention is to give students early feedback on their comprehension of the lecture material. This is a self-assessed exercise. Students do not need to submit this assignment through turnitin. Students are encouraged to discuss their answers or any problems with the unit convenor. This assessment does not count to your final grade.

Topic for Essay and Essay Outline:

Discuss the role of dopamine in reward seeking in vertebrates

Recommended paper to begin your reading: Berridge, K. C., Robinson, T. E., and Aldridge, J. W. (2009). Dissecting components of reward: 'liking', 'wanting', and learning. *Curr. Opin. Pharmcol.* 9, 65–73.

Essay outline (5 % of final mark). For this topic produce a brief outline of your essay detailing main headings, essay structure, principle conclusions and key source materials. Maximum one page of A4 paper. I don't want to see big blocks of text or a half-written assay. I want to be able to give feedback on your structure, intended content, and the nature of the argument you will develop in your essay. The intention of this assessment task is to give early feedback to students on their essay.

Essay (20 % of final mark). For the assigned topic develop the essay outline into a fully referenced essay of maximum 2000 words. There is no lower word limit. The essay must be fully referenced according to the style of the journal *Animal Behaviour*. The reference list does not count towards the word limit.

***Guide to assessment levels*. To pass this assignment you must produce a competent, coherent scientific argument that fully references primary literature. To achieve a distinction in this assignment you should show evidence of critical thinking, a capacity to structure an argument, comprehensive review of relevant literature, initiative in identifying**

relevant and current source material and a novel synthesis of information from multiple sources. Refer to marking rubric at the end of the unit guide.

Project report (30 %) During weeks 8 – 11 during the practical sessions you will participate in a study of the variation in lateralisation in humans. Working individually student will write up the project in the form of a research article to be submitted to the Journal of Experimental Biology. For the style guidelines for research articles look here:

http://jeb.biologists.org/

under 'author info'

You will also find it helpful to read some articles from Journal of Experimental Biology to help you model your writing. Maximum 3000 words, there is no lower word limit. Figure legends, abstract and references do not count towards to the word limit. The project report must be fully referenced according to the journal style

***Guide to assessment levels*: To pass this assignment you must produce a report that appropriately present, analyse your findings, and discuss these with reference to existing literature. Performance at distinction level in this assignment will involve contributing strongly and creatively to the practical work and producing a report that demonstrates a complete understanding of the rational for your topic, the state of the current relevant literature, competent and appropriate analyses, and demonstration of independent thought in analysis and interpretation of the data. Refer to marking rubric at the end of the unit guide.**

Final exam (45%). Held in the end-of-year exam period. Students will be tested on their knowledge of course content. The exam may include material from all lectures and practical classes up to and including week 13. No written material, programmable calculators or mobile phones may be brought into the exam room. Non-programmable calculators may be used.

Guide to unit assessment levels:

As a guide to approximate grade boundaries, in all assessment tasks a pass is 50-64 %, a credit is 65-74 %, distinction is 75-84 % and an HD is > 85 %.

Academic senate has a set of guidelines on the distribution of grades across the range from fail to high distinction. Your final result will include a grade plus a standardised numerical grade (SNG) that involves a process of scaling and normalising grades to ensure fare and standard grading across the university. Because of this normalising process it is possible that your raw mark for this unit calculated from your assessments

will not be identical to your SNG.

Extensions and penalties

10% of the mark allocated for the assignment will be deducted for every 24 h period (or part thereof) that any work is submitted past the nominated deadline.

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. **Applications for special consideration or extension must be lodged through *Tracker*. All applications for special consideration or extension must be sought before the due date,** unless this is absolutely impossible. Details on special consideration are provided here:

http://www.student.mq.edu.au/ses/Special%20Consideration.html

Returning assessment tasks

Assessment tasks and feedback will be returned via iLearn.

Assessment Tasks

Name	Weighting	Due
Short answer questions	0%	Week 3
Essay outline	5%	6 September
Essay	15%	6 October
Paper critique	10%	TBA
Project report	30%	14 November
Final exam	40%	TBA

Short answer questions

Due: **Week 3**
Weighting: **0%**

Short answer questions linked to the lecture content.

On successful completion you will be able to:

- Explain patterns of nervous system evolution
- Explain the complexities when relating behavioual phenotypes to the genome

Essay outline

Due: **6 September**
Weighting: **5%**

A one-page outline of your chosen essay topic.

On successful completion you will be able to:

- Source primary scientific literature to research an essay on

Essay

Due: **6 October**
Weighting: **15%**

An essay addressing one of the questions set in week 3

On successful completion you will be able to:

- Source primary scientific literature to research an essay on

Paper critique

Due: **TBA**
Weighting: **10%**

A written critical assessment of a scientific paper

On successful completion you will be able to:

- Critique, review and discuss primary scientific papers

Project report

Due: **14 November**
Weighting: **30%**

A written report of the practical project in the form of a scientific paper

On successful completion you will be able to:

- Generate hypotheses, and design new experiments to test hypotheses
- Execute a small independent scientific project.
- Present experimental findings as a paper written in the style of a recognised scientific journal
- Present a research project orally

Final exam

Due: **TBA**
Weighting: **40%**

A test on knowledge of course content up to and including wk 13.

On successful completion you will be able to:

- Explain patterns of nervous system evolution
- Explain the complexities when relating behavioual phenotypes to the genome

Delivery and Resources

Website

The course homepage containing lecture handouts, course materials and lecture recordings is available on iLearn

http://mq.edu.au/iLearn/

You must use iLearn for:

- Regularly checking subject announcements.
- Downloading lecture materials.
- Downloading laboratory materials.
- Downloading reference materials.
- Checking your grades.

If you are having trouble accessing the online unit due to a disability or health condition, please go to the Student Services Website at http://sss.mq.edu.au/equity/about for information on how to get assistance. If you are having problems logging on you should contact Student IT Help, Phone: (02) 9850 4357 (in Sydney) or 1 800 063 191 (outside Sydney).

How BBE306 works

Lectures will be held in C4A 315 on Tuesday's 10 am – 12 pm, except weeks 9 and 10. The material in weeks 9 and 10 will be pre-recorded and available in iLearn by the Monday beginning each week.

Lecture notes for each week will be uploaded to iLearn by the Sunday preceding the lecture at the latest.

Practicals will be held in F7B 102 on Fridays at either 9 am - 12 pm or 1 pm to 4 pm. Practicals are not held every week. Consult the practical handbook for full details of each week's activities.

Tutorials I will be available between 2 pm and 4 pm Tuesdays in W19F 143 (*with the*

***exception of Weeks 7, 9 and 10*) to answer questions on the material covered in the unit. If you cannot attend in person call me on 9850 1310 during these hours.**

Assignments details and deadlines are given below. All assignments must be submitted via Turnitin using the links set up in iLearn (look under the assignments tab). It is up to you to upload and submit by deadline. Feedback will also be given via Turnitin and iLearn. Submit all assignments as word documents so that I can annotate them to give feedback. Do not submit as PDF. Annotations and corrections will be made using the track-changes function of Word. To reduce paper wastage do not submit hard copy to the science center.

Unit completion requirements

To pass this subject you must achieve all of the following.

- **Receive a final overall SNG of > 50%.**
- **Submit an essay outline**
- **Submit an essay**
- **Submit a project report**
- **Take the final examination**

Required unit materials

The work carried out during practical classes is an important and integral part of the course. You must have a lab coat for the first on-campus practical session on the 10th and 11th August. Enclosed shoes are needed for every practical class in accordance with standard safety procedures. Enclosed shoes are defined as flat shoes that cover at least the front half of the foot. Without these you will not be allowed entry to the laboratory.

You will require a note book for the practical classes for your own notes and reference.

Recommended readings

This scope of the unit is such that there is no single book that covers all the course content. The course also presents and discusses the latest scientific findings, which have not percolated into the text books yet. For these reasons there is no nominated textbook for this course, rather each lecture provides a list of references and source materials. For a higher-level unit such as this it is expected that you are accessing and exploring the primary scientific literature. However, a number of books do have excellent sections that are relevant the topics covered in this unit.

These are listed below. These selected readings do not encapsulate the lecture material, they are not complete readings for a given topic, and are definitely not a substitute for the lectures or for broader reading. They are, however, the best introductory text for each topic, and will help you understand and revise the lecture material, and launch your exploration of the primary literature.

Week	Topic	Text
1	An introduction to neuroethology	Biology the Dynamic Science Russell et al 2008 Ch 37 QH308.2 .B562 2008
2	Nervous systems, and how they make decisions	An introduction to Nervous Systems Greenspan 2007 Ch 2 & 3 QP361 .G67 2007
3	Motivation, reinforcement and addiction	Fundamental Neuroscience 3rd Ed.Squire et al 2008 Ch 43 QP355.2 .F862 2008
4	Learning and cognitive ecology	Foundations of Neurobiology Delcomyn 1998 Ch 24 QP355.2 .D45 1997 Behavioral Neurobiology Carew 2000 Ch 10 QP360 .C347 2000
5	Memory	Foundations of Neurobiology Delcomyn 1998 Ch 24 QP355.2 .D45 1997 Behavioral Neurobiology Carew 2000 Ch 10, 11 QP360 .C347 2000 How genes influence behaviour Flint et al 2010 Ch 10
6	Sound and hearing	Foundations of Neurobiology Delcomyn 1998 Ch 12 Nerve cells and animal behaviour Simmons and Young 1999 Ch 6 QP356 .Y68/ 1999
7	Vision and visual navigation	Nerve cells and animal behaviour Simmons and Young 1999 QP356 .Y68/1999
8	Genes and behaviour	An introduction to behavior genetics Bazzett 2008 Ch 6, 9 QH457 B37 2008
9	Genomes and behaviour	How genes influence behaviour Flint et al 2010 Ch 6, 9, 11
10	Sex	Biological Psychology (10th ed) Kalat 2009 Ch 11 QP360 K33 2007
11	Social behaviour	How genes influence behaviour Flint et al 2010 Ch 8
12	Genes, genomes and human behaviour	Biological Psychology (10th ed) Kalat 2009 Ch 11 QP360 K33 2007 How genes influence behaviour Flint et al 2010 Ch 2, 3, 6, 9, 11

Other recommended books

7-Day loan

Animal behavior : an evolutionary approach / John Alcock. QL751 .A58/2001

Cognitive ecology : the evolutionary ecology of information processing and decision making / edited by Reuven Dukas QL785 .C5/1998

Nerve cells and animal behaviour / Peter J. Simmons and David Young QP356 .Y68/1999

The naked ape / Desmond Morris QH368 .M88

Fundamental neuroscience / edited by Larry Squire ... [et al.] QP355.2 .F862 2008

Nature via nurture : genes, experience, and what makes us human / Matt Ridley QH438.5 .R535 2003

The selfish gene / Richard Dawkins QH437 .D38

Hormones and social behavior / D. Pfaff ... [et al.] (eds.). QP356.45 .H432 2008

Biology, evolution and human nature / Timothy H. Goldsmith and William F. Zimmerman QH308.2 .G665 2001

Reserve

An introduction to nervous systems / Ralph J. Greenspan QP361 .G67 2007

Neuroethology : nerve cells and the natural behavior of animals / Jeffrey M. Camhi QP360 .C33/ 1984

Biology : the dynamic science / Peter J. Russell ... [et al.]. QH308.2 .B562 2008

Behavioral neurobiology : the cellular organization of natural behavior / Thomas J. Carew. QP360 .C347 2000

Main Collection.

Motivation a Biobehavioural approach / Roderick Wong BF503 .W665 2000

Learning and Memory from Brain to Behaviour / Mark A. Gluck, Eduardo Mercado & Catherine E. Myers QP408 .G58 2008

The Naked Man a Study of the Male Body / Desmond Morris HQ1090. M669 2009

Foundations of Neurobiology / Fred Delcomyn QP355.2 .D45 1997

Hardwired Behaviour what Neuroscience Reveals about Morality / Lawrence Tancredi BJ45.5 .T36 2005

An introduction to Behaviour Genetics / Terence J. Bazzett QH457 B37 2008

An introduction to Brain and Behaviour / Bryan Kolb & Ian Q Whishaw QP376 .K635 2006

Biological Psychology / James W. Kalat QP360 K33 2007

References to supplemental readings relevant to each lecture and practical topic will be provided for each lecture. Some of these will be posted via Blackboard as PDF files.

Unit Schedule

Lecture topics. All lectures are 2 h

Week	Date	Topic Topic	Lecturer
1	5th August	An introduction to neuroethology	Andrew Barron
2	12th August	Nervous systems, and how they make decisions	Andrew Barron
3	19th August	Motivation, reinforcement and addiction	Andrew Barron & Jennifer Cornish
4	26th August	Learning and cognitive ecology	Ken Cheng & Andrew Barron
5	2nd September	Memory	Andrew Barron
6	9th September	Sound and hearing	Andrew Barron
7	16th September	Vision and visual navigation	Patrick Schultheiss
		Mid semester break	
8	7th October	Genes and behaviour	Andrew Barron & Darren Burke
9	14th October	Genomes and behaviour	Andrew Barron
10	21st October	Sex	Andrew Barron
11	28th October	Social behaviour	Andrew Barron
12	4th November	Genes, genomes and human behaviour	Andrew Barron
13	11th November	Revision and review	Andrew Barron

Practical sessions

ASSESSMENT IN THIS UNIT

Assessment at a glance –

Task	Proportional contribution	Submission deadline	Brief description	Learning outcomes	Grad. Caps.
Short answer questions	0 %	self assessed	Short answer questions linked to the lecture content.	1,2,3	1,2,4
Essay outline	5 %	5 pm 6th September	A one-page outline of the essay topic.	3	1,2,4
Essay	20 %	5 pm 6th October	An essay addressing the question outlined below.	3	1,2,4
Project report	30 %	5 pm 14th November	A written report of the practical project in the form of a scientific paper.	4-7	1 - 6
Final exam	45 %	TBA	A test on knowledge of course content up to and including wk 13.	1,2	1 - 4

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/

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

- Explain patterns of nervous system evolution
- Explain the complexities when relating behavioual phenotypes to the genome
- Critique, review and discuss primary scientific papers

Assessment tasks

- Essay outline
- Essay
- Paper critique
- Project report
- Final exam

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

- Explain the complexities when relating behavioual phenotypes to the genome
- Source primary scientific literature to research an essay on
- Execute a small independent scientific project.
- Critique, review and discuss primary scientific papers

Assessment tasks

- Essay outline
- Essay
- Paper critique
- Project report
- Final exam

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

- Explain the complexities when relating behavioual phenotypes to the genome
- Source primary scientific literature to research an essay on
- Generate hypotheses, and design new experiments to test hypotheses
- Execute a small independent scientific project.
- Critique, review and discuss primary scientific papers

Assessment tasks

- Project report
- Final exam

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Source primary scientific literature to research an essay on
- Generate hypotheses, and design new experiments to test hypotheses

Assessment tasks

- Essay outline
- Essay
- Paper critique
- Project report
- Final exam

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Present experimental findings as a paper written in the style of a recognised scientific

journal

- Present a research project orally

Assessment task

- Project report

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:

Assessment task

- Project report