BIOL706

Advanced Studies in 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
Katherine McClellan
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Credit points
4

Prerequisites
Admission to MRes

Corequisites

Co-badged status
NCCW BBE 306

Unit description
This is an advanced unit in which you will discuss current research in neuroethology, and develop the suite of research skills needed for independent research in the biological sciences. Topics include how genes and genomes control behaviour, the neural basis of behaviour, mechanisms of learning and memory, instinct, the biology of sexual behaviour, and the extent to which our behaviour is defined by genes.

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

Assessment Tasks

Name	Weighting	Due
Essay outline	5%	Week 6
Essay	15%	Week 8
Paper critique	10%	TBA
Project report	30%	Week 13
Final exam	40%	TBA
Short answer questions	0%	Week 3

Essay outline

Due: **Week 6**
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: **Week 8**
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: **Week 13**
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

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

Delivery and Resources

CLASSES

Timetable

- Lecture: Tuesdays 12:00 – 14:00 W6B 320
- Practical 1: Fridays 10:00 – 13:00 F7B 102
- Practical 2: Fridays 14:00 – 17:00 F7B 102

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

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 practicals in weeks 4 and 5, and enclosed shoes for every practical class in accordance with standard laboratory 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 bound note book for the practical classes for your own notes and reference.

Recommended readings

This course covers a very wide scope meaning 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.

- Biology the Dynamic Science Russell et al 2008 QH308.2 .B562 2008
- An introduction to Nervous Systems Greenspan 2007 QP361 .G67 2007
- Fundamental Neuroscience 3rd Ed.Squire et al 2008 QP355.2 .F862 2008
- Foundations of Neurobiology Delcomyn 1998 QP355.2 .D45 1997
- Behavioral Neurobiology Carew 2000 QP360 .C347 2000
- Nerve cells and animal behaviour Simmons and Young 1999 QP356 .Y68/1999
- An introduction to behavior genetics Bazzett 2008 QH457 B37 2008
- How genes influence behaviour Flint et al 2010
- Biological Psychology (10th ed) Kalat 2009 QP360 K33 2007

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 iLearn as PDF files.

UNIT WEBPAGE AND TECHNOLOGY USED AND REQUIRED

Website Lecture graphics and iLectures will be available on iLearn http://learn.mq.edu.au. iLearn is a web-based computer mediated communication package and can be accessed by most web browsers from inside or outside the University. iLearn and email will be the principle method of communication in this subject. You must use iLearn for:

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

The URL for the Blackboard log-in page is: http://learn.mq.edu.au/. You will need to log in to Blackboard each time you use it. Your user name is your student number. 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://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).

Unit Schedule

Lecture Schedule

WEEK	TOPIC	LECTURER	TEXT
1	An introduction to neuroethology	Andrew Barron	Biology the Dynamic Science Russell et al 2008 Ch 37 QH308.2 .B562 2008
2	Neurons and nervous systems	Andrew Barron	An introduction to Nervous Systems Greenspan 2007 Ch 2 & 3 QP361 .G67 2007
3	Motivation, reinforcement and addiction	Jennifer Cornish	Fundamental Neuroscience 3rd Ed.Squire et al 2008 Ch 43 QP355.2 .F862 2008
4	Learning and cognitive ecology	Ken Cheng & Andrew Barron	Foundations of Neurobiology Delcomyn 1998 Ch 24 QP355.2 .D45 1997 Behavioral Neurobiology Carew 2000 Ch 10 QP360 .C347 2000
5	Memory & Introduction to practical projects	Andrew Barron	Foundations of Neurobiology Delcomyn 1998Ch 24 QP355.2 .D45 1997 Behavioral Neurobiology Carew 2000 Ch 10, 11 QP360 .C347 2000
6	Current papers in neuroethology	Student presentations	

7	Vision	Ajay Narendra	Foundations of Neurobiology Delcomyn 1998 Ch 12 Nerve cells and animal behaviour Simmons and Young 1999 Ch 6 QP356 .Y68/1999
	MID-SEMESTER BREAK		
8	Sound and hearing	Andrew Barron	Readings provided on iLearn
9	Genes and behaviour	Andrew Barron & Darren Burke	An introduction to behavior genetics Bazzett 2008 Ch 6, 9 QH457 B37 2008
10	Genes, Genomics and behaviour	Andrew Barron	How genes influence behaviour Flint et al 2010 Ch 9, 11
11	Sex	Nansi Richards	Biological Psychology (10th ed) Kalat 2009 Ch 11 QP360 K33 2007
12	Social behaviour	Clint Perry	How genes influence behaviour Flint et al 2010 Ch 8
13	Revision and review	Andrew Barron	

Practicals Schedule

WEEK	ACTIVITY
1	No practical
2	Brains
3	Immunohistochemistry 1
4	Immunohistochemistry 2
5	Confocal microscopy
6	Visual ecology
7	Projects planning
	MID-SEMESTER BREAK
8	Projects
9	Projects
10	Projects
11	Projects
12	Presentations
13	No practical

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.