## BBE 306
### Behavioural Genomics

**S2 Day 2015**

*Dept of Biological Sciences*

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### Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
<td>2</td>
</tr>
<tr>
<td>Learning Outcomes</td>
<td>2</td>
</tr>
<tr>
<td>General Assessment Information</td>
<td>3</td>
</tr>
<tr>
<td>Assessment Tasks</td>
<td>5</td>
</tr>
<tr>
<td>Delivery and Resources</td>
<td>7</td>
</tr>
<tr>
<td>Unit Schedule</td>
<td>12</td>
</tr>
<tr>
<td>Policies and Procedures</td>
<td>14</td>
</tr>
<tr>
<td>Graduate Capabilities</td>
<td>16</td>
</tr>
</tbody>
</table>

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### General Information

Unit convenor and teaching staff
Unit Convenor
Matthew Bulbert
[matthew.bulbert@mq.edu.au](mailto:matthew.bulbert@mq.edu.au)
Contact via matthew.bulbert@mq.edu.au

Co-conspirator
Peggy Even
[naila.even@mq.edu.au](mailto:naila.even@mq.edu.au)

Credit points
3

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

**Corequisites**

**Co-badged status**

**Unit description**
In this unit students engage directly with research and primary scientific papers to explore the latest findings about the complex interactions between the genome and behaviour. Topics include: the extent to which our behaviour is determined by our heritable biology, how genes and genomes control behaviour; the mechanisms of learning and memory; the evolution and biological basis of instinct; and how our behaviour can influence our genome.

### Important Academic Dates
Information about important academic dates including deadlines for withdrawing from units are available at [http://students.mq.edu.au/student_admin/enrolmentguide/academicdates/](http://students.mq.edu.au/student_admin/enrolmentguide/academicdates/)

### Learning Outcomes

1. Explain patterns of nervous system evolution
2. Explain the complexities when relating behavioural phenotypes to the genome
3. Source primary scientific literature to research an essay on
4. Generate hypotheses, and design new experiments to test hypotheses
5. Execute a small independent scientific project.
6. Present experimental findings as a paper written in the style of a recognised scientific journal
7. Present a research project orally
8. Critique, review and discuss primary scientific papers

**General Assessment Information**

**Selling your neurotransmitter (10%)**

You are currently working as a researcher for an institute known as the National Enterprise for Research by Vikings and Eskimos otherwise known as the N.E.R.V.E centre. You have a great idea for a research topic involving a neurotransmitter but you need funding. Your task is to pitch your research to an eccentric entrepreneur Sir Cecil Offelburger who owns the wildlife park – ‘Offelburger’s paradise’ – a reserve free of boring model species. Offelburger has no time for waffle and has an exceedingly little attention span and so only listens to briefs that follow certain guidelines. The guidelines include:

1. Create three Powerpoint slides with annotated notes outlining your presentation.
2. The slides must deal with the following:

   Slide 1: What is a neurotransmitter and how do they work?
   Slide 2: A general slide on your allotted neurotransmitter?
   Slide 3: How will understanding this neurotransmitter potentially benefit an animal in Sir Offelburgers wildlife park? (note this is a neuro-behavioural course and evidence for these claims will be required)

1. Sir Offelburger is a busy man as you would expect and hence has hired a team of assessors to go through the proposals (That is, you will peer assess ie rate other students brief's using a simple rubric).

**Note:** Neurotransmitters will be made available for selection

**Topic for Essay and Essay Outline:**

*Discuss the role of neurotransmitters in predator-prey interactions*


**Essay outline (0 % of final mark) but compulsory.**

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. Do not provide big blocks of text as this is an outline but key points under each topic would seem reasonable. 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.

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/](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 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 presents, and analyses 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.

Final exam (40%)

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

Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling your neurotransmitter</td>
<td>10%</td>
<td>10th and 17th of August</td>
</tr>
<tr>
<td>Essay outline</td>
<td>0%</td>
<td>7 September</td>
</tr>
<tr>
<td>Essay</td>
<td>20%</td>
<td>5 October</td>
</tr>
<tr>
<td>Project report</td>
<td>30%</td>
<td>30 October</td>
</tr>
<tr>
<td>Final exam</td>
<td>40%</td>
<td>TBA</td>
</tr>
</tbody>
</table>

Selling your neurotransmitter

Due: 10th and 17th of August
Weighting: 10%

Selling your neurotransmitter

This Assessment Task relates to the following Learning Outcomes:

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

Essay outline

Due: 7 September
Weighting: 0%
A one-page outline of your chosen essay topic.

This Assessment Task relates to the following Learning Outcomes:
• Source primary scientific literature to research an essay on

**Essay**

**Due:** 5 October  
**Weighting:** 20%

An essay addressing one of the questions set in week 3

This Assessment Task relates to the following Learning Outcomes:
• Source primary scientific literature to research an essay on

**Project report**

**Due:** 30 October  
**Weighting:** 30%

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

This Assessment Task relates to the following Learning Outcomes:
• 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

**Final exam**

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

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

This Assessment Task relates to the following Learning Outcomes:
• Explain patterns of nervous system evolution
• Explain the complexities when relating behavioural phenotypes to the genome
Delivery and Resources

How BBE306 2015 will work

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).

Lectures:

There will be no face-to-face lectures in this unit. All lectures will be pre-recorded and will be made available 9am Thursday each week.

Practicals:

This course will have regular practicals during the semester and an on campus session run during the semester break. However note the practicals are not every week and some of these practicals are more like tutorials, discussions and/or technical practice. The practicals during semester will be in 1-4pm Thursday according to the schedule below in E8A 120 & E8A 160. The on campus session will be in the E8C Labs 1 and 2 – these are the brand spanking new labs just off the biology courtyard. These days will be from 9-4pm.

Communication:

Given the delivery mode it will be important that we establish a good working relationship via ilearn forum. If you have questions about lecture material please post them via ilearn. We can then work on the answers as a group. I want to make sure that everyone is comfortable with the delivery mode and is confident enough to post questions and answers. This is a 3rd year unit so it is important you practice engaging in the course material. I will be as active as I can on ilearn to address concerns and if there are questions I am unable to answer we can research them as well as pass them onto the researchers delivering the material.
UNIT COMPLETION REQUIREMENTS

Minimum requirements include:

1. The completion and submission of all assessment tasks (taking into account special considerations)

2. Must achieve a final overall mark of >50%

3. Must attend all practicals - if you miss a practical then follow the instructions below.

Overall grades

The current university grading is: fail (F <50%), pass (P 50%-64%), credit (CR 65%-74%), distinction (D 75%-84%) and high distinction (HD 85%-100%).

What to do if you miss an assignment task or practical session through:

Illness or misfortune

- Submit special consideration via ask.mq.edu.au (Do not give doctors certificates to convener or tutor)
  - You will need to provide documentation for illness. For other situations you must provide a supporting letter explaining the circumstances that has led to you missing the practicals.
  - Inform convener that you have submitted consideration and ensure the role is marked accordingly
  - The course convener will process your special consideration. If approved it is your responsibility to arrange with the tutor/practical convener to do assignment or practical at another time.

Neglect (i.e. forgot or just slack)

- Be honest!
- Contact the practical convener to plead your case.

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.

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 10\(^{th}\) of September and the on-campus practical sessions 14\(^{th}\) and 15\(^{th}\) September. 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 notebook for the practical classes for your own notes and reference.

Recommended readings

The unit typically does not have a prescribed text and a bunch of readings will be required. However recently a text has come out that mostly covers the material in the course and it will be referred to a number of times throughout the unit. It is by Giovanni Galizia, and is called “Neurosciences: from molecule to behaviour”. It is available as a free download through the library. Its title may confuse you slightly given the course is called behavioural genomics. However to understand how the genome influences behaviour we must understand the pathways from genes to the expression of a behavioural phenotype and of course that involves understanding the neural pathways. Hence the first part of the course will examine behaviour, neural mechanisms and sensory systems while the second half of the course looks at genes and gene regulation of neural pathways that lead to the expression of behaviour.

For a higher-level unit such as this it is expected that you are also 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.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An introduction to neuroethology</td>
<td>Biology the Dynamic Science Russell et al 2008 Ch 37 QH308.2 .B562 2008</td>
</tr>
<tr>
<td>5</td>
<td>Memory</td>
<td>Foundations of Neurobiology Delcomyn 1998 Ch 24 QP355.2 .D45 1997</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How genes influence behaviour Flint et al 2010 Ch 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nerve cells and animal behaviour Simmons and Young 1999 Ch 6 QP356 .Y68/1999</td>
</tr>
<tr>
<td>7</td>
<td>Vision and visual navigation</td>
<td>Nerve cells and animal behaviour Simmons and Young 1999 QP356 .Y68/1999</td>
</tr>
<tr>
<td>8</td>
<td>Genes and behaviour</td>
<td>An introduction to behavior genetics Bazzett 2008 Ch 6, 9 QH457 B37 2008</td>
</tr>
<tr>
<td>9</td>
<td>Genomes and behaviour</td>
<td>How genes influence behaviour Flint et al 2010 Ch 6, 9, 11</td>
</tr>
<tr>
<td>10</td>
<td>Sex</td>
<td>Biological Psychology (10th ed) Kalat 2009 Ch 11 QP360 K33 2007</td>
</tr>
<tr>
<td>11</td>
<td>Social behaviour</td>
<td>How genes influence behaviour Flint et al 2010 Ch 8</td>
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<td>---------------------------------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Genes, genomes and human behaviour</td>
<td>Biological Psychology (10th ed) Kalat 2009 Ch 11 QP360 K33 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How genes influence behaviour Flint et al 2010 Ch 2, 3, 6, 9, 11</td>
</tr>
</tbody>
</table>

**Other recommended books**

**7-Day loan**


*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


*The selfish gene* / Richard Dawkins QH437 .D38


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

*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


**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

**Unit Schedule**

**Practicals:**

This course will have regular practicals during the semester and an on campus session run during the semester break. However note the practicals are not every week and some of these practicals are more like tutorials, discussions and/or technical practice. The practicals during semester will be in 1-4pm Thursday according to the schedule below in E8A 120 & E8A 160. The on campus session will be in the E8C Labs 1 and 2 – these are the brand spanking new labs just off the biology courtyard. These days will be from 9-4pm.

<table>
<thead>
<tr>
<th>Practical</th>
<th>Dates</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3rd September</td>
<td>Meet the researchers/ Major Project/ Course Issues</td>
</tr>
<tr>
<td>2</td>
<td>10th September</td>
<td>Dissecting brains</td>
</tr>
<tr>
<td></td>
<td>Mid-semester break</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14th September</td>
<td>Visualising brain function</td>
</tr>
<tr>
<td>4</td>
<td>15th September</td>
<td>Visualising brain function</td>
</tr>
<tr>
<td></td>
<td>Mid-semester break</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1st October</td>
<td>Major project: Lateralisation</td>
</tr>
<tr>
<td>9</td>
<td>8th October</td>
<td>Meet the researchers/Data collection</td>
</tr>
<tr>
<td>10</td>
<td>15th October</td>
<td>Data collection/Analyses</td>
</tr>
<tr>
<td>11</td>
<td>22nd October</td>
<td>Data analyses/Report</td>
</tr>
</tbody>
</table>
Lecture program. All lectures are 2 hours

To understand how the genome influences behaviour we must understand the pathways from genes to the expression of a behavioural phenotype, which requires an understanding of relevant neural pathways. Hence the first part of the course will examine behaviour, neural mechanisms and sensory systems while the second half of the course looks at genes and gene regulation of neural pathways that lead to the expression of behaviour.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>1</td>
<td>29th July</td>
<td>Lecture 1: Course Introduction</td>
<td>Matthew Bulbert</td>
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<td>Lecture 2: Neurons the basics</td>
<td>Naïla Even</td>
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<tr>
<td>2</td>
<td>5th August</td>
<td>Lecture 3: Circuits and Nervous Systems I</td>
<td>Naïla Even</td>
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<tr>
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<td></td>
<td>Lecture 4: Circuits and Nervous Systems II</td>
<td>Naïla Even</td>
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<tr>
<td>3</td>
<td>12th August</td>
<td>Lecture 5: Neuroendocrinology</td>
<td>Naïla Even</td>
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<td>Lecture 6: Motivation, reinforcement, addiction</td>
<td>Andrew Barron</td>
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<tr>
<td>4</td>
<td>19th August</td>
<td>Lecture 7: Learning</td>
<td>Ken Cheng</td>
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<td>Lecture 8: Cellular mechanisms of learning and memory</td>
<td>Andrew Barron</td>
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<td>5</td>
<td>26th August</td>
<td>Lecture 9: Memory I</td>
<td>Andrew Barron</td>
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<tr>
<td></td>
<td></td>
<td>Lecture 10: Memory II</td>
<td>Andrew Barron</td>
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<tr>
<td>6</td>
<td>2nd September</td>
<td>Lecture 11: Sound and hearing</td>
<td>Naïla Even</td>
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<td></td>
<td>Lecture 12: Taste and Smell</td>
<td>Naïla Even</td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Lecture 13: Vision</td>
<td>Lecture 14: Navigation</td>
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<tr>
<td>7</td>
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**Mid semester break**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture 15: Genes and behaviour I</th>
<th>Lecture 16: Genes and behaviour II</th>
<th>Andrew Barron</th>
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<tbody>
<tr>
<td>8</td>
<td>30th September</td>
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<td>Andrew Barron</td>
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<table>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture 17: Genomes and behaviour I</th>
<th>Lecture 18: Genomes and behaviour II</th>
<th>Andrew Barron</th>
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<tbody>
<tr>
<td>9</td>
<td>7th October</td>
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<td>Andrew Barron</td>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture 19: Sex I</th>
<th>Lecture 20: Sex II</th>
<th>Andrew Barron</th>
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<tr>
<td>10</td>
<td>14th October</td>
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<th>Date</th>
<th>Lecture 21: Social behaviour I</th>
<th>Lecture 22: Social behaviour II</th>
<th>Andrew Barron</th>
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<tr>
<td>11</td>
<td>21st October</td>
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<td>Andrew Barron</td>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture 23: Genomes and human behaviour I</th>
<th>Lecture 24: Genomes and human behaviour II</th>
<th>Andrew Barron</th>
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<tr>
<td>12</td>
<td>28th October</td>
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<td>Andrew Barron</td>
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<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Revision and review</th>
<th>Matthew Bulbert</th>
</tr>
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<tbody>
<tr>
<td>13</td>
<td>4th November</td>
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**Policies and Procedures**

Macquarie University policies and procedures are accessible from [Policy Central](http://mq.edu.au/policy/docs/). Students should be aware of the following policies in particular with regard to Learning and Teaching:

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

**IT Help**

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 behavioural phenotypes to the genome
- Critique, review and discuss primary scientific papers

Assessment tasks

- Selling your neurotransmitter
- Essay outline
- Essay
- 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 behavioural 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**

• Selling your neurotransmitter
• 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 tasks**

• Selling your neurotransmitter
• Project report

**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 behavioural 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**

• Selling your neurotransmitter
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

• Selling your neurotransmitter
• Essay outline
• Essay
• Project report
• Final exam

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 tasks

• Selling your neurotransmitter
• Project report