



MEDI704

Decoding the Brain

S1 Day 2019

Medicine and Health Sciences Faculty level units

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Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

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Credit points

4

Prerequisites

Admission to MRes and (MEDI204 or BIOL257 or PSY354)

Corequisites

Co-badged status

Unit description

In this unit, students will be introduced to the approaches researchers use to investigate brain structure and function. Building on students' pre-requisite knowledge of the basic principles of neuroscience, the focus of this unit will be to explain how these discoveries were made, focusing on experimental design, analysis and rapidly developing technologies. The unit will be divided into six thematic blocks that will each consider a landmark discovery in neuroscience; in seminars students will discuss the historical context of the research, the approaches used to obtain and analyse the experimental data, its impact on the field and alternative strategies that could be used to address the same problem today. Theoretical work will be supported by workshops that will explain experimental design and technology and provide students with hands-on experience in the analysis and interpretation of neuroscience data.

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 the functional organisation of the nervous system as it pertains to the

transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.

Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.

Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.

Develop skills that will be used to analyse and interpret real experimental data.

Demonstrate proficient skills in research communication and self-directed learning.

General Assessment Information

General Assessment Information

Grade descriptors and other information concerning grading are contained in Schedule 1 of the Macquarie University Assessment Policy, which is available at: <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/assessment>.

Further details for each assessment task will be available on iLearn.

All final grades in the Master of Research/Bachelor of Philosophy are determined by a grading committee and are not the sole responsibility of the Unit Convenor.

Students will be awarded a final grade plus a Standardised Numerical Grade (SNG). The SNG is not necessarily a summation of the individual assessment components. The final grade and SNG that are awarded reflect the corresponding grade descriptor in the Grading Policy.

To pass this unit, students must demonstrate sufficient evidence of achievement of the learning outcomes, attempt all assessment tasks, meet any ungraded requirements including professionalism and achieve an SNG of 50 or better.

Student Professionalism

In the Faculty of Medicine and Health Sciences, professionalism is a key capability embedded in all our courses. As part of developing professionalism, students are expected to attend all small group interactive sessions including tutorials, as well as clinical- and laboratory-based practical sessions where applicable.

Furthermore, lectures and seminars are key learning activities that you are expected to attend the course. While audio recordings and lecture slides may be made available following large group sessions, it is important to recognise that such resources are a study aid - and should not be considered an alternative to lecture or seminar attendance.

Students who do not maintain adequate attendance (greater than or equal to 80% of scheduled classes) may be deemed unable to meet expectations regarding professionalism and may be

referred for disciplinary action (which may include exclusion from assessments and unit failure).

Similarly, as part of developing professionalism, students are expected to submit all work by the due date. Applications for assessment task extensions must be supported by appropriate evidence and submitted via ask.mq.edu.au. For further details please refer to the Special Consideration Policy available at <https://students.mq.edu.au/study/my-study-program/special-consideration>

Late Submission

All assignments which are officially received after the due date, and where no extension has been granted, will incur a deduction of 10% for the first day, and 10% for each subsequent day including the actual day on which the work is received. Weekends and public holidays are included. For example:

Due date	Received	Days late	Deduction	Raw mark	Final mark
Fri 14th	Mon 17th	3	30%	75%	45%

Assessment Tasks

Name	Weighting	Hurdle	Due
In Class Test	15%	No	Week 2
Journal Article Review	25%	No	Week 7
Final Test	40%	No	University Exam Period
Journal Club	20%	No	Ongoing

In Class Test

Due: **Week 2**

Weighting: **15%**

Students will face an ‘open book’ in-class test in which they are faced with a number of hypotheses or challenges and are asked to design an experiment to address them or to interpret a piece of data.

On successful completion you will be able to:

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those

insights were gained.

- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Journal Article Review

Due: **Week 7**

Weighting: **25%**

1000-word review that critically appraises a recently published neuroscience research article. In this assessment students will select a research article that appeals to them based on its novelty, approach, or significance, and subject it to 'peer review'. The objectives of the exercise are to succinctly summarise the article, identify its key strengths and weaknesses, and make recommendations for improvements to the study. Each student is expected to select a different article. No articles published within the previous year are admissible.

On successful completion you will be able to:

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.
- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Final Test

Due: **University Exam Period**

Weighting: **40%**

Students will face a second 'open book' challenge in which they are faced with a number of hypotheses or challenges and are asked to design an experiment to address them or to interpret a piece of data. The topics faced will align with the content of the unit.

On successful completion you will be able to:

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the

nervous system. Describe the key experimental observations through which those insights were gained.

- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Journal Club

Due: **Ongoing**

Weighting: **20%**

Students will participate in a rotating weekly student-led journal club that considers contemporary neuroscience articles that have been published in the last 12 months. Each week a student will distribute a paper to be discussed at Journal Club the following week. All students are expected to read the paper in advance. The student leading Journal Club will direct a discussion of the paper which will focus on the background to the study, the techniques used, the analysis and interpretation of the results, and the novelty and implications of the findings.

On successful completion you will be able to:

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.
- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Delivery and Resources

Technology Used

Active participation in the learning activities throughout the unit will generally require students to have access to a tablet, laptop or similar device. Students who do not own their own laptop computer may borrow one from the university library.

Required Unit Materials

All students are required to wear closed shoes and a lab coat/gown to attend practical classes and assessments in a laboratory venue.

Recommended Readings

Unit readings for this unit are available via iLearn.

Learning and Teaching Activities

Lectures

Each week students will attend two 1-hour lectures which will incorporate significant in-class discussion that will be led by an expert in the field. Students are required to read the learning material associated with each lecture available via iLearn in advance.

Journal Club

Each week students will participate in a student-led journal club.

Workshop

Each week students will participate in a 1-hour workshop related to the learning activities for that week. This will involve computer and wet laboratory visits that may include handling human and animal specimens.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway \(https://students.mq.edu.au/support/study/student-policy-gateway\)](https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

[s://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@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

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

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

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.
- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Assessment tasks

- In Class Test
- Journal Article Review
- Final Test
- Journal Club

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the

nervous system. Describe the key experimental observations through which those insights were gained.

- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Assessment tasks

- In Class Test
- Journal Article Review
- Final Test
- Journal Club

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.
- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
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Assessment tasks

- In Class Test

- Journal Article Review
- Final Test
- Journal Club

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Explain the functional organisation of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.
- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
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- Develop skills that will be used to analyse and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning.

Assessment tasks

- In Class Test
- Journal Article Review
- Final Test
- Journal Club

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Explain the functional organisation of the nervous system as it pertains to the

transmission of information between neurons, the conduction of electrical activity and ultimately the encoding of information within the various functional systems of the nervous system. Describe the key experimental observations through which those insights were gained.

- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Demonstrate proficient skills in research communication and self-directed learning.

Assessment tasks

- In Class Test
- Journal Article Review
- Final Test
- Journal Club

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

- Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer unknown questions.
- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.

Assessment tasks

- Journal Article Review
- Final Test
- Journal Club

Changes from Previous Offering

None.

Changes since First Published

Date	Description
10/ 02/ 2019	Reference to Master of Research under General Assessment Information has been changed to Master of Research/Bachelor of Philosophy