MEDI7004

Decoding the Brain

Session 2, Weekday attendance, North Ryde 2021

Medicine, Health and Human Sciences Faculty level units

Contents

Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff
Simon McMullan
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Jennifer Rowland
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Credit points
10

Prerequisites
Admission to MRes and ((MEDI204 or MEDI2300) or (BIOL257 or BIOL2230) or (PSY354 or PSYU3354))

Corequisites

Co-badged status

Unit description
This unit will introduce students to contemporary approaches to the investigation of brain structure and function. You will focus on applying rapidly developing technologies to unravel the complex organisation of the brain circuits that underlie movement, sensation and homeostatic function. You will be introduced to strategies and tools, including the genetic, optical, electronic and analytical tools neuroscientists use to probe the workings of the brain. You will also be introduced to the obstacles that will need to be overcome if future scientists are to explain the most complex structure in the known universe.

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:

ULO1: Explain the functional organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and describe the key experimental observations through which those insights were gained.

ULO2: Demonstrate proficient knowledge of current research techniques used in neuroscience and design experiments that use them to answer questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
ULO3: Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
ULO4: Analyze and interpret real experimental data.
ULO5: Demonstrate proficient skills in research communication and self-directed learning by reviewing and appraising the contemporary neuroscience literature and conveying their findings to their peers.

General Assessment Information

Journal Club Presentation

Assessment Type [1]: Presentation Indicative Time on Task [2]: 20 hours Due: **once per session, rostered** Weighting: **20%**

You will participate in and occasionally present during weekly student-led journal clubs that considers contemporary neuroscience articles.

On successful completion you will be able to:

- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Analyze and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning by reviewing and appraising the contemporary neuroscience literature and conveying their findings to their peers.

In class test

Assessment Type [1]: Examination Indicative Time on Task [2]: 10 hours Weighting: **15%**

You will face two ‘open book’ in-class challenges in which they are presented 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 organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and 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 questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
- Analyze and interpret real experimental data.

Journal Article Review

Assessment Type [1]: Report Indicative Time on Task [2]: 15 hours Weighting: **25%**

1000-word review that critically appraises a recently published Neuroscience research article.

On successful completion you will be able to:

- Explain the functional organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and 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 questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
- 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 by reviewing and appraising the contemporary neuroscience literature and conveying their findings to their peers.

Final Exam

Assessment Type [1]: Examination Indicative Time on Task [2]: 25 hours Weighting: **40%**

You will face two ‘open book’ in-class challenges 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 organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and 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 questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
- Analyze and interpret real experimental data.

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Learning Skills Unit for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Assessment Tasks

Name	Weighting	Hurdle	Due
In class test	15%	No	5/08/21
Journal Club Presentation	20%	No	ongoing
Journal Article Review	25%	No	6/09/21
Final Exam	40%	No	University Exam Period

In class test

Assessment Type [1]: Examination
Indicative Time on Task [2]: 10 hours
Due: **5/08/21**
Weighting: **15%**

You will face two ‘open book’ in-class challenges in which they are presented 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 organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and 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 questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
- Analyze and interpret real experimental data.

Journal Club Presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 20 hours
Due: **ongoing**
Weighting: **20%**

You will participate in and occasionally present during weekly student-led journal clubs that considers contemporary neuroscience articles.

On successful completion you will be able to:

- Critically evaluate the neuroscience literature and identify current gaps in knowledge or misconceptions relating to a topic of their choice.
- Analyze and interpret real experimental data.
- Demonstrate proficient skills in research communication and self-directed learning by reviewing and appraising the contemporary neuroscience literature and conveying their findings to their peers.

Journal Article Review

Assessment Type [1]: Report
Indicative Time on Task [2]: 15 hours
Due: **6/09/21**
Weighting: **25%**

1000-word review that critically appraises a recently published Neuroscience research article.

On successful completion you will be able to:

- Explain the functional organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and 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 questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
- 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 by reviewing and appraising the contemporary neuroscience literature and conveying their findings to their peers.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 25 hours
Due: **University Exam Period**
Weighting: **40%**

You will face two 'open book' in-class challenges 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 organization of the nervous system as it pertains to the transmission of information between neurons, the conduction of electrical activity ultimately the encoding of information within the various functional systems of the nervous system, and 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 questions relating to structure and function of the brain or the development of novel experimental or analytical techniques.
- Analyze and interpret real experimental data.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Teaching Platforms

In 2021 content will be delivered via a combination of synchronous and asynchronous electronic media. Unless otherwise indicated on iLearn, **Lectures** will be prerecorded and embedded on

iLearn; **Tutorials** and **Workshops** will be delivered in person or, in some cases, via electronic conferences tools such as Zoom. Some content will be delivered using the **Flipped Classroom** approach, in which students are provided with a topic and relevant resources and asked to prepare oral or written content on that topic. Instructions will be provided in advance on iLearn. Questions can be directed to teaching staff, other students or the unit convenor via iLearn.

Technology Used

Active participation in the learning activities throughout the unit will generally require students to have access to an internet-connected 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.

Unit Schedule

Unit Schedule

Lectures

Each week students will receive two 1-hour lectures by an expert in the field. Lectures will be delivered online in **precorded video** format or students will prepare their own material on a topic in a **Flipped** format, using resources provided in advance. Flipped classrooms will use synchronouse video (e.g. Zoom) or asynchronous text (e.g. iLearn Forum) technologies. Students are required to read the learning material associated with each lecture available via iLearn in advance and to participate in discussion.

Journal Club

Journal Club is a commonly used method of developing researchers' critical thinking and presentation skills while familiarising them with the recent scientific literature. The format is an hour-long student-led discussion: each week a different student is rostered to select a recently published research article, which they will distribute in advance to other members of the group. At Journal Club the Presenting Student gives an overview of the Background, Methods and Results of the paper, with visual guides as appropriate, and leads a critique of the paper. Journal Club is an interactive activity - the Presenter is supposed to lead the discussion, but all members of the group are expected to contribute to the conversation.

The Unit Convenor will explain the format, provide an example presentation, and develop a roster for subsequent presentations.

Workshops/Tutorials

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, prerecorded or synchronous online discussions, or in-person tutorials.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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

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

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/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 help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

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.