



BIOL2230

Neurophysiology

Session 1, In person-scheduled-infrequent, North Ryde 2023

School of Natural Sciences

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General Information

Unit convenor and teaching staff

Kevin Danastas

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Credit points

10

Prerequisites

50cp at 1000 level or above including [(BIOL2220 or BIOL247) or (20cp from (BIOL1110 or BIOL115) or (BIOL1210 or BIOL108) or (ANAT1001 or HLTH108) or (ANAT1002 or HLTH109) or (PSYU1104 or PSYC104 or PSYU1101) or (PSYU1105 or PSYC105 or PSYU1102) or (COGS1000 or COGS100))]

Corequisites

Co-badged status

Unit description

This Unit considers the structure and function of the nervous system. We begin with an overview of the functional organization of the central and peripheral divisions of the nervous system. We discuss how the selective permeability of the cell membrane gives rise to the electrical properties of excitable cells. We look in detail at the generation, propagation and transmission of neural signals, and examine the important principles of sensory physiology such as transduction, adaptation and stimulus coding. Having covered these basic principles, the unit goes on to explore the somatosensory system, and the nerves and organs that give rise to the special senses (vision, hearing, taste and smell) are also discussed. We next examine the structure and physiology of muscle cells, and the central control of motor function. Lastly, we cover the autonomic nervous system and the neuroendocrine system, both of which regulate numerous physiological processes throughout the body.

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 how neural signals are generated, transmitted and processed in different parts of the nervous system

ULO2: Understand how the nervous and endocrine systems interact

ULO3: Synthesise information taken from the scientific literature about the nervous system and present it to your peers in a concise format

ULO4: Assemble basic electrophysiology recording equipment and perform simple electrophysiological experiments

ULO5: Analyse and interpret the results of simple tests of neural function on human and/or invertebrate animal subjects

General Assessment Information

Requirements to pass this unit

To pass this unit, you must achieve a total mark equal to, or greater than, 50%.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is **11:55 pm**. A 1-hour grace period will be provided to students who experience a technical concern.

For example, an assessment worth 20% is due 11.55 pm on 1 January. Student A submits the assessment at 10 pm, 3 January. The assessment received a mark of 18/20. A 10% deduction is then applied to the total possible mark (20), resulting in the loss of two (2) marks. Student A is then awarded a final mark of 16/20.

For any late submissions of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for [Special Consideration](#).

Assessments where Late Submissions will be accepted:

Lab reports and scientific poster - YES, Standard Late Penalty applies

Online quizzes and mid-semester test - NO, unless special consideration is granted

Special Consideration

The [Special Consideration Policy](#) aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Online quizzes

The three quizzes are 20-minute online quizzes which you may do at home. Each quiz has 12

questions. Quiz questions can be multiple choice, short answer, fill in the blanks or calculations. Only one attempt at each quiz is allowed. Similar to the mid-semester test you will see only one question at a time. You will have only one chance to answer each question. You will answer questions sequentially. You may not go back in the quiz to correct any answers. Think carefully before answering and budget your overall time carefully. You will be expected to use correct spelling and grammar in your answers.

Midsemester Test

This test will include 35 quiz questions to be completed in 50 minutes. Any of the material covered in weeks 1-7 (lectures and practicals) may be included in the mid-semester test. Questions can be multiple choice, short answer, fill in the blanks or calculations. You must complete the test individually. During the test you will see only one question at a time. You will have only one chance to answer each question. You will answer questions sequentially. You may not go back in the quiz to correct any answers. Think carefully before answering and budget your overall time carefully. You will be expected to use correct spelling and grammar in your answers.

Practical classes, lab reports and scientific poster

Through your enrolment and personal timetable, you will be assigned a practical time slot and you are expected to attend all practical classes.

The details of each of the three lab reports and the scientific poster are in the practical notes which can be accessed through iLearn. The completed assignments must be submitted to Turnitin on the due dates given in the table above.

Final exam

The exam is a two hour paper with multiple choice questions, and short answer questions. All the lecture and practical material is examinable.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Quizzes</u>	9%	No	Consult iLearn for due dates
<u>Lab reports</u>	20%	No	Consult iLearn for submission dates
<u>Scientific poster</u>	6%	No	28th May 11:55pm
<u>Mid-Semester Test</u>	20%	No	30th April 11:55pm
<u>Practice Based task</u>	0%	No	Consult iLearn for classes
<u>Final Exam</u>	45%	No	S1 exam period

Quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **Consult iLearn for due dates**

Weighting: **9%**

These short online tests are designed to help you assess your progress in learning the unit content.

On successful completion you will be able to:

- Explain how neural signals are generated, transmitted and processed in different parts of the nervous system
- Assemble basic electrophysiology recording equipment and perform simple electrophysiological experiments
- Analyse and interpret the results of simple tests of neural function on human and/or invertebrate animal subjects

Lab reports

Assessment Type ¹: Lab report

Indicative Time on Task ²: 18 hours

Due: **Consult iLearn for submission dates**

Weighting: **20%**

You will prepare and submit lab reports based on lab activities that involve collection and analysis of neurophysiological data. These assessments link with lectures and other information sources and test your knowledge of the relevant neural systems.

On successful completion you will be able to:

- Explain how neural signals are generated, transmitted and processed in different parts of the nervous system
- Understand how the nervous and endocrine systems interact
- Synthesise information taken from the scientific literature about the nervous system and present it to your peers in a concise format
- Assemble basic electrophysiology recording equipment and perform simple

electrophysiological experiments

- Analyse and interpret the results of simple tests of neural function on human and/or invertebrate animal subjects

Scientific poster

Assessment Type ¹: Poster

Indicative Time on Task ²: 2 hours

Due: **28th May 11:55pm**

Weighting: **6%**

You will be assessed on your ability to present a data set and synthesise information on a neuroscience topic as a scientific poster presentation.

On successful completion you will be able to:

- Synthesise information taken from the scientific literature about the nervous system and present it to your peers in a concise format
- Analyse and interpret the results of simple tests of neural function on human and/or invertebrate animal subjects

Mid-Semester Test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **30th April 11:55pm**

Weighting: **20%**

The mid semester test will examine your knowledge of the concepts covered in lectures and lab classes from Weeks 1 to 7 inclusive.

On successful completion you will be able to:

- Explain how neural signals are generated, transmitted and processed in different parts of the nervous system
- Assemble basic electrophysiology recording equipment and perform simple electrophysiological experiments

Practice Based task

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Consult iLearn for classes**

Weighting: **0%**

Demonstration of practical laboratory skills and knowledge of protocols, and the submission of practical tasks

On successful completion you will be able to:

- Explain how neural signals are generated, transmitted and processed in different parts of the nervous system
- Understand how the nervous and endocrine systems interact
- Synthesise information taken from the scientific literature about the nervous system and present it to your peers in a concise format
- Assemble basic electrophysiology recording equipment and perform simple electrophysiological experiments

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 2 hours

Due: **S1 exam period**

Weighting: **45%**

The final exam will be an invigilated exam held during the Semester 1 Exam Period. The exam will use a mixture of multiple choice and short answer questions to evaluate your understanding of neurophysiological concepts presented in lectures and lab classes throughout the unit.

On successful completion you will be able to:

- Explain how neural signals are generated, transmitted and processed in different parts of the nervous system
- Assemble basic electrophysiology recording equipment and perform simple electrophysiological experiments

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

Recommended text

The textbook for this unit is “Principles of Human Physiology” by Cindy L Stanfield, published by Pearson. Available electronically through the 'Unit readings - Leganto' Block in iLearn.

Lectures

There will be two lectures each week. No in-person lectures for this unit. Each week's lectures will be made available through H5P. Lectures are often broken up into shorter chunks to make them easier to listen to, and are linked very closely to the text book material so the supporting reading is very clear. All lecture notes will be available in the week-by-week sections on iLearn.

Practical classes

Practical classes for all students will be taught face-to-face and will be on campus. They will be held in labs 102, 105 and 110 in building 4 Wally's Walk. For internal (frequent attendance) students, practicals will begin in week 2. Please refer to your personal timetable to identify the specific practical class you enrolled in. All notes and materials for the practical classes can be found in the Practicals block on iLearn.

Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the general BIOL2230 mailbox, biol257@mq.edu.au, from your university email address.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: <https://www.mq.edu.au/about/coronavirus-faqs>. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Week	Week begins	Lectures	Practical classes (room 102, 105, 110 4WW)
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1	20 February	L1 - Nervous System Overview L2 - Anatomy of the Brain	
2	27 February	L3 - Resting Membrane Potential L4 - Receptors and Graded Potentials	
3	6 March	L5 - Action potentials and Nerve Conduction L6 - Introduction to Electrophysiology	
4	13 March	L7 - Neuronal Communication L8 - Principles of Sensory Physiology	
5	20 March	L9 - Somatosensory System L10 - Pain	
6	27 March	L11 - Special Senses - Olfaction and Gustation L12 - Special Senses - Hearing & Balance	
7	3 April	L13 - Special Senses - Vision I L14 - Special Senses - Vision II	
		MIDSEMESETER BREAK	<u>External student practicals April 20 and 21</u> Prac 1 - Functional Anatomy Prac 2 - Action Potentials Prac 3 - Neuropharmacology Prac 4 - Somatosensory
8	24 April	L15 - Muscle Physiology and Muscle Disorder L16 – Smooth and Cardiac Muscle	Mid-semester test (delivered as an at home online quiz)
9	1 May	L17 – Motor Neurons and Reflexes L18 – Upper Motor Neurons	
10	8 May	L19 – Cerebellum and Basal Ganglia L20 - Neurodegenerative Disorders	<u>External student practicals May 13 and 14</u> Prac 5 - Sensory Thresholds: Taste and Smell Prac 6 - Muscle Physiology Prac 7 - Vision & Hearing Prac 8 - Reflexes and Autonomic Nervous System
11	15 May	L21 - Autonomic Nervous System I L22 - Autonomic Nervous System II	

12	22 May	L23 - Neuroendocrine System I L24 - Neuroendocrine System II	Revision
13	29 May	No lectures	No practical classes

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing an](#)

[d maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the 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

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

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.

Changes since First Published

Date	Description
23/01/ 2023	Updated assessment due dates - original due date for the scientific poster was wrong