



# BIOL2230

## Neurophysiology

Session 1, In person-scheduled-weekday, North Ryde 2022

*School of Natural Sciences*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

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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

Online quizzes, in-class activities, or scheduled tests and exam must be undertaken at the time indicated in the unit guide. Should these activities be missed due to illness or misadventure, students may apply for Special Consideration.

All other assessments must be submitted by 5:00 pm on their due date. Should these assessments be missed due to illness or misadventure, students should apply for Special Consideration.

Late submissions will be accepted for the infographic and lab report assessments with penalties applied for late submissions as follows:

A 12-hour grace period will be given after which the following deductions will be applied to the awarded assessment mark: 12 to 24 hours late = 10% deduction; for each day thereafter, an additional 10% per day or part thereof will be applied until five days beyond the due date. After this time, a mark of zero (0) will be given. For example, an assessment worth 20% is due 5 pm on 1 January. Student A submits the assessment at 1 pm, 3 January. The assessment received a mark of 15/20. A 20% deduction is then applied to the mark of 15, resulting in the loss of three (3) marks. Student A is then awarded a final mark of 12/20.

## 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.

## Infographic and presentation

The ability to communicate complex scientific (or other) concepts in simple terms to a range of audiences is a critical skill for scientists, clinicians and many other professions. This can be achieved effectively using an infographic: a visual representation of data, concepts or instructive material. Your task is to create a unique infographic that describes and explains one aspect of the visual system. You will also present your infographic in class.

## Lab report and practical classes

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 practical assignments are in the practical notes which can be accessed through iLearn.

## 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
<a href="#">Lab reports</a>	20%	No	Consult iLearn for submission dates
<a href="#">Quizzes</a>	9%	No	Consult iLearn for quiz dates
<a href="#">Mid-Semester Test</a>	20%	No	30th April 11:55pm
<a href="#">Presentation</a>	6%	No	15th May 11:55pm
<a href="#">Final Exam</a>	45%	No	S1 exam period
<a href="#">Lab classes</a>	0%	No	Consult iLearn for classes

## Lab reports

Assessment Type <sup>1</sup>: Lab report

Indicative Time on Task <sup>2</sup>: 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

## Quizzes

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 1 hours

Due: **Consult Ilearn for quiz 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

## Mid-Semester Test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 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

## Presentation

Assessment Type <sup>1</sup>: Presentation

Indicative Time on Task <sup>2</sup>: 2 hours

Due: **15th May 11:55pm**

Weighting: **6%**

You will be assessed on your ability to synthesise information on a neuroscience topic and prepare an infographic and short presentation. You will also be assessed on your ability to prepare a visual information summary and deliver an oral 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

## Final Exam

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 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

## Lab classes

Assessment Type <sup>1</sup>: Participatory task

Indicative Time on Task <sup>2</sup>: 0 hours

Due: **Consult Ilearn for classes**

Weighting: **0%**

Through a range of lab activities you will learn about the physiology of the nervous system. You will assemble basic apparatus to measure neural function in animal models and perform simple tests of nerve function in humans.

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

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<sup>1</sup> 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.

<sup>2</sup> 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 “Principals of Human Physiology” by Cindy L Stanfield, published by Pearson. You can subscribe to the new digital version (6th addition)

<http://www.pearson.com.au/978129215649>

and you do not need MyLab/Mastering.

The 5th Edition is also suitable. 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 Echo, which can be accessed through the unit iLearn page. 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.

## 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 in the unit iLearn page.

## Unit Schedule

Off-shore students **must** email the convenor as soon as possible to discuss study options.

On-campus teaching continues to be scheduled for Session 1, 2022. Masks are compulsory for all classes in indoor spaces and social distancing will be implemented wherever possible. Students will also be required to sanitise surfaces before and after use.

Students are requested to minimise the risk of spreading COVID to themselves and others in accordance with the university and NSW Health guidelines: <https://www.mq.edu.au/about/corona-virus-faqs> and <https://www.nsw.gov.au/covid-19/stay-safe>.

Any further requirements or changes to units in relation to COVID will be communicated to students via iLearn.

### Class Schedule

Week	Week begins	Lectures (available on echo)	Practical classes (room 102, 105, 110 4WW)
1	21 February	L1 - Nervous System Overview I L2 - Nervous System Overview II	No practical class



2	28 February	L3 - Resting Membrane Potential L4 - Receptors and graded potentials	Comparative functional anatomy
3	7 March	L5 - Action potentials and nerve conduction L6 - Introduction to electrophysiology	Action potentials (lab report assessment)
4	14 March	L7 - Neuronal communication I L8 - Neuronal communication II	Neuropharmacology (lab report assessment)
5	21 March	L9 - Principles of sensory physiology L10 - Somatosensory system	Somatosensory practical and worm nerve conduction demonstration
6	28 March	L11 - Pain L12 - Special senses - Olfaction and Gustation	Sensory thresholds: taste and smell (lab report assessment)
7	4 April	L13 - Special senses - Hearing L14 - Special senses - Vestibular system	Revision tutorials (prep for midsemester test)
<b>MIDSEMESETER BREAK</b>			
8	26 April	L15 - Special Senses – Vision I L16 – Special Senses – Vision II	No practical activity. Mid-semester test (delivered as an at home online quiz)
9	2 May	L17 – Skeletal muscle L18 – Smooth and cardiac muscle	Vision practical and presentations
10	9 May	L19 – Motor control I L20 - Motor control II	Reflexes
11	16 May	L21 - Autonomic nervous system I L22 - Autonomic nervous system II	Autonomic system
12	23 May	L23 - Neuroendocrine system I L24 - Neuroendocrine system II	No practical classes – time available for revision
13	30 May	L25 – Revision L26 - Revision	No practical classes – time available for revision

## 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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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 and 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 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/](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
17/02/2022	Updating teaching staff and contact