



# BIOL2230

## Neurophysiology

Session 1, In person-scheduled-infrequent, North Ryde 2024

*School of Natural Sciences*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Kevin Danastas

[kevin.danastas@mq.edu.au](mailto:kevin.danastas@mq.edu.au)

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 - 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](http://ask.mq.edu.au).

### Online quizzes

The five quizzes are 30-minute online quizzes that you may do at home. Each quiz will be open

for 7 days and consist of 12 questions. Quiz questions can be multiple-choice, short answers, fill in the blanks or calculations. Only one attempt at each quiz is allowed. You will see only one question at a time but you can go back to review your answers at any point. Think carefully before answering and budget your overall time carefully. You will be expected to use correct spelling and grammar in your answers.

## Lab reports and scientific poster

The two lab reports and one scientific poster are based on data you will obtain during the practical classes. If you miss the practical classes, or for whatever reason do not have this data, please contact the unit convenor. A marking rubric is provided for each assessment. Please pay close attention to this marking rubric, as this is what the markers will base your grade on.

## 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="#">Quizzes</a>	15%	No	Weeks 3, 4, 7, 11 and 12
<a href="#">Scientific poster</a>	20%	No	Week 11
<a href="#">Lab reports</a>	20%	No	Weeks 10 and 12
<a href="#">Final Exam</a>	45%	No	Exam period

## Quizzes

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

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

Due: **Weeks 3, 4, 7, 11 and 12**

Weighting: **15%**

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
- Understand how the nervous and endocrine systems interact

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

## Scientific poster

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

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Week 11**

Weighting: **20%**

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

## Lab reports

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

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Weeks 10 and 12**

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
- 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

## Final Exam

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

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

Due: **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
- Understand how the nervous and endocrine systems interact
- Analyse and interpret the results of simple tests of neural function on human and/or invertebrate animal subjects

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

### Week 1

Lectures will commence in week 1. Practical classes will be offered in intensive-mode, beginning in the mid-session break. Please refer to your personal timetable and the sections below for more information.

## 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 textbook 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 106, 110 and 112 in building 6 Wally's Walk. For infrequent students, practicals will be held during the mid-session break and week 11. 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 on iLearn.

## Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to the unit convenor can be via email, private message via iLearn or sent to the general BIOL2230 mailbox, [biol257@mq.edu.au](mailto: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 CLASS (106, 110 AND 112 6WW)
1	Monday 19 February	L1 - Nervous System Overview L2 - Anatomy of the Brain & Spinal Cord	-
2	Monday 26 February	L3 - Resting Membrane Potential L4 - Receptors & Graded Potentials	-
3	Monday 4 March	L5 - Action Potentials & Nerve Conduction L6 - Introduction to Electrophysiology	-
4	Monday 11 March	L7 - Neuronal Communication L8 - Principles of Sensory Physiology	-
5	Monday 18 March	L9 - Somatosensory System L10 - Pain	-
6	Monday 25 March	L11 - Special Senses - Olfaction & Gustation L12 - Special Senses - Hearing & Balance	-

WEEK	WEEK BEGINS	LECTURES	PRACTICAL CLASS (106, 110 AND 112 6WW)
7	Monday 1 April	L13 - Special Senses - Vision I L14 - Special Senses - Vision II	-
8	Monday 8 April	L15 - Skeletal Muscle Physiology L16 - Muscle Contraction & Tension	-
	Monday 15 April	<b>MID-SEMESTER BREAK</b>	Saturday 20th April 9am - 11am: Functional Anatomy 12pm - 2pm: Action Potentials 3pm - 5pm: Neuropharmacology  Sunday 21st April 9am - 11am: Somatosensory System 12pm - 2pm: Sensory Thresholds: Taste & Smell
9	Monday 29 April	L17 - Smooth & Cardiac Muscle L18 - Motor Neurons & Reflexes	-
10	Monday 6 May	L19 - Upper Motor Neurons, Cerebellum & Basal Ganglia L20 - Neurodegenerative Disorders	Saturday 11th May 9am - 11am: Muscle Physiology 12pm - 2pm: Vision & Hearing 3pm - 5pm: Reflexes & Autonomic Nervous System
11	Monday 13 May	L21 - Autonomic Nervous System I L22 - Autonomic Nervous System II	-
12	Monday 20 May	L23 - Neuroendocrine System I L24 - Neuroendocrine System II	-
13	Monday 27 May	L25 - Revision I L26 - Revision II	-

## 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 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/](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 from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link on the iLearn page.

The assessment structure has been altered for S1 2024. Changes include the removal of the mid-semester exam and the re-distribution of assessment weighting to more align with the workload each assessment requires.

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Unit information based on version 2024.02 of the [Handbook](#)