



BIOL2230

Neurophysiology

Session 1, Special circumstances, North Ryde 2021

Archive (Pre-2022) - Department of Biological Sciences

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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.

Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff

Andrew Barron

BIOL2230@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

Online quizzes

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

Mid-semester Test

This test will include 35 multiple choice questions to be completed in 50 minutes. Any of the material covered in weeks 1-6 (lectures and practicals) may be included in the mid-semester test. 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.

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. The completed assignments must be submitted to Turnitin by 11.55pm 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.

Academic Honesty – please read, as this is very important

Presenting the work of another person as one's own is a serious breach of the University's rules and carries significant penalties. The University's Academic Honesty Policy can be found at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html In this unit, we will be checking written work for plagiarism using TURNITIN. Penalties for plagiarism may include a zero mark for the assignment or in more extreme cases, failure of the unit. Plagiarism WILL be noted on your academic record. Full details of penalties can be found at http://www.mq.edu.au/policy/docs/academic_honesty/schedule_penalties.html

Extensions, penalties and disruptions to studies

Late assignments will attract a penalty of 10% of the total marks allocated to the exercise per day. You may hand in your work after the due date and escape penalty only if you have an acceptable reason (usually a medical certificate). Discuss your problem with the Lecturer as early as possible before the due date, however note that all requests for extensions MUST be submitted using the online form: ask.mq.edu.au. Information about the Disruptions to Studies policy and procedure is online at Policy Central: http://www.mq.edu.au/policy/docs/disruption_studies/procedure.html. Information on managing your Disruptions to Studies: http://students.mq.edu.au/student_admin/manage_your_study_program/disruption_to_studies/

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|-----------------------------------|-----------|--------|------------------------------------|
| Final Exam | 45% | No | Exam period. Date TBA |
| Lab classes | 0% | No | Weeks 2 - 11 |
| Presentation | 6% | No | Presentations in practicals week 9 |
| Mid-Semester Test | 20% | No | Quiz closes April 24 |
| Quizzes | 9% | No | Quiz schedule in iLearn |
| Lab reports | 20% | No | Report schedule in iLearn |

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 2 hours

Due: **Exam period. Date TBA**

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 ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **Weeks 2 - 11**

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

Presentation

Assessment Type ¹: Presentation

Indicative Time on Task ²: 2 hours

Due: **Presentations in practicals week 9**

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

Mid-Semester Test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **Quiz closes April 24**

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

Quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **Quiz schedule in iLearn**

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

Lab reports

Assessment Type ¹: Lab report

Indicative Time on Task ²: 18 hours

Due: **Report schedule in iLearn**

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

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

There will be two lectures each week. No in-person lectures for this unit. Each week's lectures will be made available through Echo.

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 (weekday attendance) students, practicals will be on Wednesday and Thursday of each week, starting in week 2. Please refer to your personal timetable to identify the specific practical class you enrolled in.

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) at

<http://www.pearson.com.au/9781292156491>

and you do not need MyLab/Mastering.

The 5th Edition is also suitable. Available electronically through the 'Unit readings - Leganto' Block in iLearn.

iLearn

Your iLearn site will contain everything you need for this course, including discussion forums and class announcements. You should check this site regularly. You should also check your university email regularly for important announcements.

Past exam papers, and the final exam in 2021

At the moment we expect the final exam to be a paper exam held on campus during the exam block and invigilated.

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

To help you prepare for the final exam you may wish to look at past exam papers. These can be accessed from the library using this link.

https://multisearch.mq.edu.au/primo-explore/search?search_scope=Past%20Exam%20Papers&vid=MQ&query=any,contains,BIOL257

Note that the structure of the exam in 2021 will be similar to, but not identical to previous years.

Unit Schedule

All lectures will be available as recordings in Echo. No face-to-face lectures

Practicals will be on-campus and face-to-face. These will be held in labs 102, 105 and 110 of 4WW. Practical are held on Wednesdays and Thursdays. Your personal timetable which show

which session you enrolled in.

| Week | Week begins | Lectures (available on echo) | Practical classes (room 102, 105, 110 4WW) |
|--------------------------|-------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1 | 22 February | L1 - Nervous System Overview I L2 - Nervous System Overview II | No practical class |
| 2 | 1 March | L3 - Resting Membrane Potential L4 - Receptors and graded potentials | Comparative functional anatomy |
| 3 | 8 March | L5 - Action potentials and nerve conduction L6 - Introduction to electrophysiology | Action potentials (lab report assessment) |
| 4 | 15 March | L7 - Neuronal communication I L8 - Neuronal communication II | Neuropharmacology (lab report assessment) |
| 5 | 22 March | L9 - Principles of sensory physiology L10 - Somatosensory system | Somatosensory practical and worm nerve conduction demonstration |
| 6 | 29 March | L11 - Pain L12 - Special senses - Olfaction and Gustation | No practical classes (Good Friday 2 April) |
| MIDSEMESTER BREAK | | | |
| 7 | 19 April | L13 - Special senses - Hearing L14 - Special senses - Vestibular system | No practical activity. Mid-semester test (delivered as an at home online quiz) |
| 8 | 26 April | L15 - Special Senses – Vision I L16 – Special Senses – Vision II | Sensory thresholds: taste and smell (lab report assessment) |
| 9 | 3 May | L17 – Skeletal muscle L18 – Smooth and cardiac muscle | Vision practical and presentations |
| 10 | 10 May | L19 – Motor control I L20 - Motor control II | Reflexes |
| 11 | 17 May | L21 - Autonomic nervous system I L22 - Autonomic nervous system II | Autonomic system |

| | | | |
|----|--------|-----------------------------------------------------------------|----------------------------------------------------|
| 12 | 24 May | L23 - Neuroendocrine system I L24 - Neuroendocrine system II | No practical classes – time available for revision |
| 13 | 31 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](#)
- [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 \(https://students.mq.edu.au/support/study/policies\)](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

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.

Changes since First Published

| Date | Description |
|------------|-----------------------|
| 03/02/2021 | Linked to SC offering |