BIOL2230
Neurophysiology
Session 1, In person-scheduled-infrequent, North Ryde 2024
School of Natural Sciences

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General Information

Unit convenor and teaching staff
Kevin Danastas
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.

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>15%</td>
<td>No</td>
<td>Weeks 3, 4, 7, 11 and 12</td>
</tr>
<tr>
<td>Scientific poster</td>
<td>20%</td>
<td>No</td>
<td>Week 11</td>
</tr>
<tr>
<td>Lab reports</td>
<td>20%</td>
<td>No</td>
<td>Weeks 10 and 12</td>
</tr>
<tr>
<td>Final Exam</td>
<td>45%</td>
<td>No</td>
<td>Exam period</td>
</tr>
</tbody>
</table>

**Quizzes**

Assessment Type 1: Quiz/Test  
Indicative Time on Task 2: 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: Poster

Indicative Time on Task: 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: Lab report

Indicative Time on Task: 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 1: Examination
Indicative Time on Task 2: 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

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.

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 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, 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

<table>
<thead>
<tr>
<th>WEEK</th>
<th>WEEK BEGINS</th>
<th>LECTURES</th>
<th>PRACTICAL CLASS (106, 110 AND 112 6WW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday 19 February</td>
<td>L1 - Nervous System Overview L2 - Anatomy of the Brain &amp; Spinal Cord</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Monday 26 February</td>
<td>L3 - Resting Membrane Potential L4 - Receptors &amp; Graded Potentials</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Monday 4 March</td>
<td>L5 - Action Potentials &amp; Nerve Conduction L6 - Introduction to Electrophysiology</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Monday 11 March</td>
<td>L7 - Neuronal Communication L8 - Principles of Sensory Physiology</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Monday 18 March</td>
<td>L9 - Somatosensory System L10 - Pain</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Monday 25 March</td>
<td>L11 - Special Senses - Olfaction &amp; Gustation L12 - Special Senses - Hearing &amp; Balance</td>
<td>-</td>
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</tbody>
</table>
# Unit Guide

**BIOL2230 Neurophysiology**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>WEEK BEGINS</th>
<th>LECTURES</th>
<th>PRACTICAL CLASS (106, 110 AND 112 6WW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Monday 1 April</td>
<td>L13 - Special Senses - Vision I L14 - Special Senses - Vision II</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Monday 8 April</td>
<td>L15 - Skeletal Muscle Physiology L16 - Muscle Contraction &amp; Tension</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Monday 15 April</td>
<td>MID-SEMESTER BREAK</td>
<td>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 &amp; Smell</td>
</tr>
<tr>
<td>9</td>
<td>Monday 29 April</td>
<td>L17 - Smooth &amp; Cardiac Muscle L18 - Motor Neurons &amp; Reflexes</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Monday 6 May</td>
<td>L19 - Upper Motor Neurons, Cerebellum &amp; Basal Ganglia L20 - Neurodegenerative Disorders</td>
<td>Saturday 11th May 9am - 11am: Muscle Physiology 12pm - 2pm: Vision &amp; Hearing 3pm - 5pm: Reflexes &amp; Autonomic Nervous System</td>
</tr>
<tr>
<td>11</td>
<td>Monday 13 May</td>
<td>L21 - Autonomic Nervous System I L22 - Autonomic Nervous System II</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Monday 20 May</td>
<td>L23 - Neuroendocrine System I L24 - Neuroendocrine System II</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Monday 27 May</td>
<td>L25 - Revision I L26 - Revision II</td>
<td>-</td>
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## 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 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
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 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.

Unit information based on version 2024.02 of the Handbook