



UNSW
AUSTRALIA

Medical Sciences
Medicine

DEPARTMENT OF PHYSIOLOGY

NEUR 3221

Neurophysiology

COURSE OUTLINE

SEMESTER 2, 2016

CRICOS Provider Code 00098G

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Please read this outline in conjunction with the following pages on the

[School of Medical Sciences website:](#)

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at medicallsciences.med.unsw.edu.au)

NEUR3221 Course Information

Neurophysiology (NEUR3221) is a stage three course worth six units of credit (6 UOC) administered by the School of Medical Sciences. It is delivered across 12 teaching weeks in session 2, with six contact hours per week. NEUR3221 can be undertaken upon successful completion of Physiology 1A (PHSL2101 / 2121 / 2501). The course can contribute to a study plan in Physiology or Neuroscience for the Bachelor of Science or Bachelor of Medical Sciences.

In 2016, Neurophysiology (NEUR3221) will commence in the week beginning 25 July.

The content of the course provides an understanding of how cells in the nervous system work together to perform various functions. This course complements Molecular and Cellular Neuroscience (NEUR3121) which focuses on the structure and function of individual neurons and their ion channels and receptors. Students also find that this course complements Muscle and Motor Control (NEUR3101), Neuroanatomy (ANAT3411), and Neuropharmacology (PHAR3202).

OBJECTIVES OF THE COURSE

To gain an understanding of the principles of neurophysiology by:

- using molecular, synaptic and cellular processes to explain brain function
- grasping the relationship between experimental techniques and the data they produce

COURSE CO-ORDINATOR and LECTURERS

Course Coordinator:

Dr John Power
Rm 303 Wallace Wurth Building
ph: 9385 2910 john.power@unsw.edu.au

Course Co-Coordinator

Dr. Gila Moalem-Taylor
Translational Neuroscience Facility,
Level 3 Wallace Wurth Building
ph: 9385 2478 gila@unsw.edu.au

Students wishing to see the course coordinators should make an appointment *via* email as our offices are not readily accessible. We will organize to meet you in a convenient location elsewhere in the building.

Lecturers in this course:

Prof Gary Housley	g.housley@unsw.edu.au
A/Prof Pascal Carrive	p.carrive@unsw.edu.au
Dr Richard Vickery	richard.vickery@unsw.edu.au
Prof Cynthia Shannon Weickert	c.weickert@neura.edu.au
Dr Janet Taylor	j.taylor@neura.edu.au
Dr. Ria Arnold	ria.arnold@unsw.edu.au

COURSE STRUCTURE and TEACHING STRATEGIES

Learning activities occur on the following days and times:

- Lectures: Monday 9-10 am, Tuesday 2-3 pm and Thursday 1-2 pm
- Practicals: Tuesday 3-6 pm

Students are expected to attend all scheduled activities for their full duration (3 hours of lectures / tutorials per week and up to 3 hours of practical sessions per week). Students are reminded that UNSW recommends that a 6 units-of-credit course should involve about 150 hours of study and learning activities. The formal learning activities are approximately 72 hours throughout the semester and students are expected (and strongly recommended) to do at least the same number of hours of additional study.

Lectures will provide you with the concepts and theory essential for an understanding of neurophysiology. To assist in the development of research and analytical skills practical classes and tutorial learning sessions will be held. These classes allow students to engage in a more interactive form of learning than is possible in the lectures. The skills you will learn in practical classes are relevant to your development as professional scientists.

APPROACH TO LEARNING AND TEACHING

The learning and teaching philosophy underpinning this course is centred on student learning and aims to create an environment which interests and challenges students. The teaching is designed to be engaging and relevant in order to prepare students for future careers.

Although the primary source of information for this course is the lecture material, effective learning can be enhanced through self-directed use of other resources such as textbooks and Web based sources. Your practical classes will be directly related to the lectures and it is essential to prepare for practical classes before attendance. It is up to you to ensure you perform well in each part of the course; preparing for classes; completing assignments; studying for exams and seeking assistance to clarify your understanding.

TEXTBOOKS AND OTHER RESOURCES

Prescribed Textbook

Neuroscience: Exploring the Brain. 4th edition, 2015
Bear, Connors & Paradiso
Williams & Wilkins, ISBN-13: 978-0781778176

Recommended Textbooks:

Neuroscience.5th edition, 2012
Purves, Augustine, Fitzpatrick, Hall, LaMantia & White
Sinaur Associates ISBN 978-0-87893-695-3

Principles of Neural Science, 5th edition, 2012
Kandel, Schwartz, Jessell, Siegelbaum & Hudspeth AJ (Editors)
McGraw-Hill. ISBN 978-0071390118

[An advanced textbook for extended reading. Copies held in the UNSW library]

The books are available from the UNSW Bookshop, and limited copies are held by the UNSW library. Other resources:

medalsciences.med.unsw.edu.au/students/undergraduate/learning-resources

STUDENT LEARNING OUTCOMES

Specific Learning outcomes:

By the end of this course students are expected to have gained:

- a demonstrable knowledge of the scope of neurophysiology, and detailed knowledge in some areas including somatosensory system and synaptic plasticity.
- experience in applying basic physical and physiological principles to resolve questions related to brain and behaviour.
- experience and expertise in critical enquiry by designing and executing a neurophysiological experiment.
- by practical experience and critical review, an appreciation of the relationship between the experimental techniques that provide neurophysiological data, and the constraints on interpretation that the techniques impose.

Faculty of Science and UNSW graduate attributes are found at:

medalsciences.med.unsw.edu.au/students/undergraduate/advice-students#graduate

COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students about the course and continual improvements are made based on this feedback. The Course and Teaching Evaluation and Improvement (CATEI) Process of UNSW is the way in which student feedback is evaluated and significant changes to the course will be communicated to subsequent cohorts of students.

Based on the feedback received from 2015:

- The linkage between lectures will be emphasised through thematic grouping of lectures.
- Online quizzes will occur at more frequent intervals to maintain student engagement in the lecture material by providing regular frequent feedback.

Students enrolled in the course will be invited to elect two student representatives who will meet with the course convener and teaching staff on two occasions during the session, in a student feedback forum. The representatives need to seek feedback from their colleagues on the content, delivery and relevance of the course and any other issues that arise. The information gathered from this process will be used to inform any future improvements to the course.

ASSESSMENT PROCEDURES

Online quizzes (x5)	10%
Progress Test 1 (50 minute duration)	15%
Progress Test 2 (50 minute duration)	15%
DIY practical	
Group experimental plan – risk assessment - SWP	5%
Group prac report	15%
Individual peer mark	5%
End of Session Exam (2 hour duration)	35%

A penalty will apply for late submissions of assessment tasks (10% per day).

Material pertaining to both the lectures and practical classes will be examined in both the progress tests and the final exam.

There will be **a series of online feedback quizzes** throughout the session covering each topic. These quizzes will be made available online approximately every fortnight. These quizzes are to be used as a study aid and you will receive immediate detailed feedback after submitting your answers. The quizzes are to be attempted in your own time and each quiz will be accessible for a period of one week. You may attempt these quizzes as many times as you wish within this period. You will receive 2% towards your overall grade for each quiz provided you achieve a minimum score of 85% for the quiz.

There will be two progress exams throughout the course. These exams will be comprised of short answer questions, multiple choice and/or short calculations. The questions will be based on the material covered in the lectures and practical classes. The purpose of these progress exams is to provide feedback to students on their understanding and application of the concepts developed in the course and to prepare students for the final exam.

The DIY practical. Students will, in groups, design and complete their own neurophysiology practical. Each group is to submit their experimental design, a risk assessment and safe work procedure via Moodle, prior to the mid-term break; Friday 23 September 5pm. Two prac sessions (Tuesday 11 October and Tuesday 18 October) will be dedicated to the DIY prac. All students are expected to initiate their experiments during 11 October session. Students will spend the second session completing their experiments and / or analysing data. The group DIY prac report is due Wednesday the 26th of October 11:59 pm. After submission of the prac report, each student will detail and evaluate the contributions of the other group members to the project and the preparation of the report. Students will receive an individual mark based on the assessment of their peers.

The end of session exam will be comprised of short answer questions, multiple choice and/or short calculations that may include some simple calculations. The short answer questions will be based on the material covered in the lectures and practical classes. Material covered in the progress exams may be again examined in the final exam. The lecturer who provided the question will mark the short answer questions. Students are advised to use the list of previous exam questions provided to self-evaluate their progress during the course, although questions from year to year may vary as the content of the course is developed.

GENERAL INFORMATION

The Department of Physiology is part of the School of Medical Sciences and is within the Faculty of Medicine. It is located in the Wallace Wurth building (C27). General enquiries can be made at the School of Medical Sciences Reception, located on level 2 of the Wallace Wurth building (office hours are 9.00 am - 5:00 pm).

Professor Gary Housley is Head of the Department of Physiology and appointments to see him may be made through his Administrative Assistant on 9385 2804.

There are two honours programs available through the School of Medical Sciences. The School of Medical Sciences Honours program is coordinated by Dr Thomas Fath t.fath@unsw.edu.au. In addition, the School of Medical Sciences and the School of Psychology jointly run the Neuroscience Honours program coordinated by Dr John Power john.power@unsw.edu.au.

Any students considering an Honours year should discuss the requirements with the coordinator. Please see:

SoMS: medalsciences.med.unsw.edu.au/students/soms-honours/overview

Neuroscience:

medalsciences.med.unsw.edu.au/students/undergraduate/neuroscience/honours

Postgraduate research degrees

The School of Medical Sciences offers students the opportunity to enter into a Masters (MSc) or Doctorate (PhD) program in Physiology. For further information contact the Postgraduate Coordinator, Dr Pascal Carrive: p.carrive@unsw.edu.au

Please see: medalsciences.med.unsw.edu.au/students/postgraduate-research/overview

Enrolment and administrative help

Ms Justine Maguire-Scarvelli is available to help with problems with enrolment and scheduling, and should be the first point of contact for administrative problems. They can be found in the [BSB Student Office](#), Room G27, Ground floor of the BioSciences Building. ph:9385 2464, SOMSenquiries@unsw.edu.au

Attendance Requirements

For details on the Policy on Class Attendance and Absence see [Advice for Students](#) and the [Policy on Class Attendance and Absence](#).

Attendance at practical classes is compulsory, and must be recorded in the class roll at the start of each class. Arrival more than 15 minutes after the start of the class will be recorded as non-attendance. It is your responsibility to ensure that the demonstrator records your attendance and no discussions will be entered into after the completion of the class. Satisfactory completion of the work set for each class is essential. It should be noted that non-attendance for other than documented medical or other serious reasons, or unsatisfactory performance, for more than 1 practical class during the session may result in an additional practical assessment exam or ineligibility to pass the course. Students who miss practical classes due to illness or for other reasons must submit a copy of medical certificates or other documentation to the course coordinator.

Special Consideration

Please see [UNSW-Special Consideration](#) and [Student Advice-Special Consideration](#)

The supplementary exam dates for Semester 2, 2016 have not yet been confirmed but will most likely be held in the week commencing 5 December, 2016.

If you unavoidably miss a progress exam in NEUR3221, you must lodge an application with UNSW Student Central for special consideration. If your request for consideration is granted an alternative assessment will be organised which may take the form of a supplementary exam or increased weighting of the final exam.

Academic Integrity and Plagiarism

The [UNSW Student Code](#) outlines the standard of conduct expected of students with respect to their academic integrity and plagiarism. More details of what constitutes plagiarism can be found [here](#).

Practical Classes

The practical class is an opportunity for students to develop graduate attribute 3 by behaving in an ethical, socially responsible and professional manner within the practical class.

Students must take due care with biological and hazardous material and make sure all equipment is left clean and functional. In the interests of safety, special attention should be paid to any precautionary measures recommended in the notes. If any accidents or incidents occur they should be reported immediately to the demonstrator in charge of the class who will record the incident and recommend what further action is required.

For more details see [Advice for Students-Practical Classes](#)

LECTURE and PRACTICAL OUTLINES

The course timetable is appended to these notes

The course is divided into the following themes:

Foundations

Course Overview – Neurons and Glia [Moalem-Taylor]
Synaptic Transmission [Power]
CNS Structure & Function Overview [Moalem-Taylor]
Recording Neuronal Activity [Power]
Synaptic transmission Simulation [Power]

Neural Coding

Neural Coding [Vickery]
Simple Neuronal Networks [Power]
Peripheral Tactile [Vickery]
Central Tactile [Vickery]
Tactile Psychophysics Prac [Vickery]
Neural Network Simulation [Power]
Cockroach Nerve Prac [Power]

Kinaesthesia

Kinaesthesia I [Taylor]
Kinaesthesia II [Taylor]
Kinaesthesia Prac [Taylor]

Pain

Introduction to Pain [Moalem-Taylor]
Pain Scenarios [Moalem-Taylor]

Auditory Neurophysiology

Introduction to Hearing: the Cochlea [Housley]
Cochlear Pathophysiology [Housley]
Central Auditory Pathways [Housley]
Auditory Neurophysiology Prac [Housley]

Brain & Body

Hypothalamic Regulation of Autonomic Function [Carrive]
Enteric Nervous System [Power]

Wiring and Re-wiring the Nervous System

Memory Systems [Power]
Development [Weickert]
Memory & Synaptic Plasticity [Power]
Memory & Network Plasticity [Power]

CNS dysfunction -

Neurobiology of Mental Illness [Shannon Weickert]
Neurobiology of Addiction [Power]
Peripheral Neuropathy [Arnold]

Neural Therapeutics

Neurostimulation [Power]
Gene therapy [TBD]
Neuro-prosthetics [Vickery]

2016 TIMETABLE

Wk	Week starting	MONDAY (9 – 10 am) Lecture – WW LG03	Tuesday (2 – 3 pm) Lecture - CLB 2	Thursday (1 – 2 pm) Lecture - WW LG02	Tuesday (3 – 6 pm) Prac Group A (WW) (Room 120 or G16/17)	Tuesday (3 – 6 pm) Prac Group B (WW) (Room 120 or G16/17)
1	25/7	Course Overview Neurons and Glia [Moalem-Taylor]	Synaptic Transmission [Power]	CNS Structure & Function Overview [Moalem-Taylor]	NO PRAC	NO PRAC
2	1/8	Recording Neuronal Activity [Power]	Neural Coding [Vickery]	Simple Neuronal Networks [Power]	Tactile Psychophysics [Vickery]	Synaptic Transmission [Power]
3	8/8	Peripheral Tactile [Vickery]	Central Tactile [Vickery]	Neural coding tutorial	Synaptic Transmission [Power]	Tactile Psychophysics [Vickery]
4	15/8	Kinaesthesia I [Taylor]	Kinaesthesia II [Taylor]	Pre exam tutorial	Kinaesthesia [Taylor]	Neural Networks [Power]
5	22/8	Progress Exam 1	Introduction to Pain [Moalem-Taylor]	Post exam review Pain tutorial [Moalem-Taylor]	Neural Networks [Power]	Kinaesthesia [Taylor]
6	28/8	Introduction to Hearing: the Cochlea [Housley]	Cochlear Pathophysiology [Housley]	Central Auditory Pathways [Housley]	Auditory Prac [Housley]	Experimental Design [Power]
7	5/9	Hypothalamic Regulation of Autonomic Function [Carrive]	Enteric Nervous System [Power]	Tutorial	Experimental Design [Power]	Auditory Prac [Housley]
8	12/9	Memory Systems [Power]	Development [Weickert]	Memory & Synaptic Plasticity [Power]	Cockroach Nerve [Vickery]	TBD
9	19/9	DIY prac assistance	Memory & Network Plasticity [Power]	Pre exam tutorial	TBD	Cockroach Nerve [Vickery]
break						
10		Labour Day	No class	No class	No class	No class
11	10/10	Progress Exam 2	Neurobiology of Mental Illness [Weickert]	Post exam review	DIY Prac Rm 120	DIY Prac Rm 120
12	17/10	Neurobiology of Addiction [Power]	Peripheral Neuropathy [Arnold]	Neurostimulation [Power]	DIY Prac Rm 120	DIY Prac Rm 120
13	24/10	Gene therapy [Housley or Von Jonquieres]	Neuro-prosthetics [Vickery]	Final exam prep	NO PRAC	NO PRAC

ASSESSMENT TASKS

Task	Due Date
Online Quiz (1)	09 August
Online Quiz (2)	23 August
Online Quiz (3)	12 September
Online Quiz (4)	27 September
Online Quiz (5)	31 October
Progress Test 1	22 August
Progress Test 2	10 October
Final Exam	TBD
Student Designed Prac (Topic and Group Agreement)	08 September
Student Designed Prac (Proposal including RA and SWP)	23 September
Student Designed Prac (Group Report)	26 October
Student Designed Prac (Reflection and Peer Review)	28 October