



UNSW
A U S T R A L I A

FACULTY OF MEDICINE & FACULTY OF SCIENCE
SCHOOL OF MEDICAL SCIENCES & SCHOOL OF PSYCHOLOGY

NEUROSCIENCE FUNDAMENTALS

NEUR2201

SESSION 2, 2016

*An introductory multi-disciplinary course in Neuroscience delivered by
Anatomy, Physiology, Pharmacology, Psychology*

COURSE OUTLINE



Neuroscience Fundamentals
NEUR2201

WELCOME

Neuroscience Fundamentals is a multi-disciplinary course that brings together neuroscientists from across UNSW to deliver a course that is broad-reaching, up-to-date, and on a subject that is one of the last great frontiers of knowledge.

The course is structured into five fortnight-long modules, each taught by members of two or more different neuroscientific disciplines. Each module includes a hands-on lab, and concludes with a tutorial and short quiz. This format allows us to tackle some “big questions” in neuroscience. We will do our best to ensure that you find the course as exciting and fulfilling as we find our own engagement in the research, study and practice of neuroscience.

Please view the welcome video on the NEUR2201 Moodle page

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Please read this manual/outline in conjunction with the following pages on the [School of Medical Sciences website](#):

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

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

COURSE STAFF

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Prof Ernie Somerville		Neurology

Consultations

Dr Vickery & A/Prof Moorhouse share responsibility for academic and administrative matters regarding the course. Please approach them for any questions or problems concerning the course. It is best to arrange an appointment in advance by email, copying both into the email.

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. She can be found in the [BSB Student Office](#), Room G27, Ground floor of the BioSciences Building. ph:9385 2464
Email: SOMSenquiries@unsw.edu.au

COURSE INFORMATION

Course Structure and Teaching Strategies

Units of credit: This course is worth 6 units of credit.

Contact hours: This course structure is

- two lectures per week
- one 3 hour practical class per fortnight
- one 90 minute tutorial class
- ongoing 15 min in class assessments, typically in each fortnightly lab class (see Schedule for precise dates)

Class Times and Locations: (please consult the Course Schedule on Moodle)

Lectures are one hour long, from 3pm on Mondays in Mathews Lecture Theatre A, and from 10am on Thursdays in Mathews Lecture Theatre B.

Tutorials which generally run every second week are held in the Mathews building: the **10am** class (this is the 9-12 slot) is in room 312, the 1pm class (this is the 1-4 slot) is in room 102.

Practical classes which generally run in the alternate weeks to the tutorials are usually held in Wallace Wurth 120 except for the first week where they will be in WW101E.

Course schedule

The current course timetable is on the NEUR2201 Moodle website.

Requirements for Practical Classes

Practicals involving the use of animal or human specimens are a privilege, and must be treated with respect and professionalism. Students are expected to adhere to NH&MRC guidelines for ethics in animal and human studies, available at nhmrc.gov.au/publications/synopses/ea16syn.htm & http://nhmrc.gov.au/publications/ethics/2007_humans/contents.htm

Students must take due care with biological and hazardous material and make sure all equipment is left clean and functional. Those unwilling to follow these basic laboratory rules will be marked absent.

Enclosed shoes are compulsory in all practical classes. Punctual arrival is expected, and mobile phones must be switched off before entering the class. Practical classes that involve student participation may require the subject to sign a witnessed, informed consent form.

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

Further Study

UNSW has a broad range of subjects dealing with Neuroscience, and you can take a major in Neuroscience as part of the BSc or BScAdv. Talk to Dr Vickery, the Program Authority for Neuroscience, if you would like more information on further study options.

APPROACH TO LEARNING AND TEACHING

The philosophy underpinning this course and its Teaching and Learning Strategies is based on [“Guidelines on Learning that Inform Teaching at UNSW”](#). The teaching of Neuroscience Fundamentals is based on conceiving neuroscience as a core field of knowledge to which many different disciplines contribute. The course is structured in two-week modules that cover topics that are fundamental, but still active frontiers of investigation. Each topic is taught by several members of faculty drawn from different disciplines. In this way the scope and range of approaches in tackling major issues in neuroscience are made clear. Neuroscience is primarily an experimental discipline and so a proper appreciation of neuroscience requires an understanding of both what is known, and of the limitations imposed by our study tools.

Lectures provide the concepts and theory essential for understanding neuroscience. The practical classes assist in the development of research and analytical skills, and allow more interactive learning. The tutorials are a mix of case presentations, video material, critical analysis of literature and informal discussion to support the exploration of the material in more depth.

The primary source of information for this course is the material delivered in lectures, practical classes and tutorials, but effective learning can be enhanced through self-directed use of other resources such as textbooks. 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.

Aims of the Course

Students will gain an understanding of the modern neuroscience.

Specifically...

- Students will develop an understanding of the cross-disciplinary field of neuroscience by study of major neuroscience topics at a scale ranging from molecular through synaptic and cellular processes up to the level of the whole animal, including human behaviour.
- Students will develop an insight into the methods by which problems in neuroscience are investigated as well as the technical limitations behind many of the currently unresolved issues.

Student Learning Outcomes

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

- a demonstrable knowledge of the scope of neuroscience, and detailed knowledge in some areas relating cellular properties to the response of whole organs and animals
- experience in applying basic biological and psychological principles to resolve questions related to brain and behaviour.
- experience and expertise in locating and appraising information related to neuroscience and succinctly presenting conclusions related to these enquiries.
- experience and expertise in critical enquiry by contributing to scientific discussion.
- by practical experience and critical review, an appreciation of the relationship between the experimental techniques that provide neuroscientific data, and the constraints on interpretation that the techniques impose.

ASSESSMENT

Assessment tasks

- End of fortnightly module quizzes (best 4 out of 5) **20%**
- Short answer practice & peer marking **5%**
- On-line multiple choice bank (reading game) **5%**
- Group project *Neuroscience in the Media* **25%**
- Final exam **45%**

Each fortnight-long module has a short quiz at the end, run during the practical class the following week. These quizzes are done online, and take about 15 minutes to complete. A variety of forms of assessment are used in the quizzes including labelling figures and filling gaps in text. These quizzes provide immediate feedback on your progress, and review content that will be covered in the short-answer questions of the final exam. Your best four results will be counted.

To give you some experience with the written question format of the exam we will have an in-class assessment. This will be peer-marked and marked by the convenors.

You will contribute to a bank of multiple choice questions by both completing and rating questions, and generating your own questions. This will provide an opportunity to practice for the final exam.

The group project is explained in more detail on page 9 of this course outline.

The final exam is 2 hours long, and consists of thirty multiple choice questions, and five short answer questions (one per topic) of which you are required to answer four. The module quizzes and online multiple choice assessment are similar in format to the two types of question in the final exams.

TEXTBOOKS AND READING LIST

Textbook:

Neuroscience: Exploring the Brain 3rd edition
Mark F. Bear, Barry W. Connors, Michael A. Paradiso
Lippincott Williams & Wilkins ISBN:0781760038
(recommended for students continuing in neuroscience)

or

Neuroanatomy and Neuroscience at a Glance 4th edition
Roger A. Barker, Francesca Cicchetti
Wiley-Blackwell ISBN:9780470657683

Recommended reading:

Principles of Neural Science
Kandel, Schwartz, Jessell, Siegelbaum & Hudspeth
McGraw-Hill

Medical Physiology, a cellular and molecular approach.
Boron & Boulpaep
Saunders

Neuroscience
Purves, Augustine, Fitzpatrick et al.
Sinaur

The books are available from the UNSW Bookshop, and are held by the UNSW library.

CONTINUAL COURSE IMPROVEMENT (CATEI)

Feedback from students provides critical guidance for the continual development and improvement of this course. Student feedback on the course is generally positive, but CATEI feedback in 2013 and written comments to the course convenor have contributed to changes in course content in 2014 and 2015. You are again invited to provide online anonymous course feedback via Moodle throughout the session to enable immediate response. We will also ask your assistance in completing the end-of-session Course and Teaching Evaluation and Improvement [CATEI] at the appropriate time.

Part of the CATEI process is to communicate significant changes to the course to subsequent cohorts of students. The last CATEI course assessment was in 2015 and gave generally very positive feedback. For the question, "Overall I was satisfied with the quality of this course", there were 43% strongly agree and 58% agree or moderately agree. Here are some sample comments from 2015:

1. Best features:

"The practical sessions where we got to actually use some of the equipment and see how the technology works. It was both fun and interesting, and I really liked the hands-on element."

"Fun, interactive"

"A lot of variety in topics was covered"

"Offered different learning tools e.g. practical classes, tutorials, lectures, quizzes."

"Practical classes were the best feature of the course. Fun and engaging whilst also being very challenging"

2. Course could be Improved by:

"Did not find the online quizzes to be very helpful (especially the first couple where there were some technical issues)"

"Slightly more time to consolidate info between modules"

"Assigning (sic) groups for the group assignment."

"Better assessments. I thought that the lab quizzes (worth 25% of our overall mark) were a very poor reflection of our knowledge and understanding of the course content..... the quizzes tested a very small and selected portion of the content"

The course has been modified for 2016 as follows.

1. The number of modules has been reduced from 6 to 5 to allow two weeks for other activities and consolidation, including time for project work.
2. The module quizzes have been reviewed to try to improve how well they reflect course content. The weighting has been reduced and a different student-authored MCQ game introduced
3. Groups for the group project will be assigned.
4. A practice exam exercise that includes peer assessment and feedback has been introduced

ADMINISTRATIVE INFORMATION

The following page provides general student information

<http://medicallsciences.med.unsw.edu.au/students/undergraduate/advice-students>

Official Communication

All communicate will be via your official UNSW email please see [Advice for Student-Official Communication](#) for more details.

Attendance Requirements

For details on the Policy on Class Attendance and Absence see [Advice for Students](#) and the [Policy on Class Attendance and Absence](#). Guidelines on extra-curricular activities affecting attendance can be found on the School of Medical sciences Website.

<http://medicallsciences.med.unsw.edu.au/students/undergraduate/advice-students#Special Consideration>

Attendance at practical classes and tutorials 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. Satisfactory completion of the work set for each class is essential. Students who miss practical classes, tutorial assessment, or other assessment deadlines due to illness or for other reasons, must submit a copy of medical certificates or other acceptable documentation via the Online Services in myUNSW. The application should be lodged no more than three days after an absence.

Handwriting

Please see [Student Advice-handwriting](#).

Special Consideration

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

If you unavoidably miss assessment tasks for this course you must lodge an application with UNSW Student Central for special consideration within 3 days. If you believe that your performance in a course, either during session or in an examination, has been adversely affected by sickness or for any other reason, you should notify use the Online Services in myUNSW to ask for special consideration in the determination of your results. 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.

Student Support Services

Details of the available student support services can be found at [Student Advice-Student support services](#).

Appeal Procedures

Details can be found at [Student-Advice-Reviews and Appeals](#)

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](#)

Neuroscience in the Media WIKI ASSESSMENT TASK

<p>Requirement:</p>	<p>You will be assigned to work in a group of four students and should firstly identify a single online media item (such as a YouTube video, advertisement, or newspaper article) in the area of neuroscience.</p> <p>As a group you will prepare a wiki page detailing the neuroscientific context and evaluating the quality of information in the media item.</p> <p>As an individual you will provide editorial review to another group's project and provide feedback on your group members.</p>
<p>Contribution to assessment:</p>	<p>The group online project assessment will contribute 25% to your final mark for the course. The mark break-down is as follows:</p> <p>15% for the group project, as a common mark to all group members. 5% for the project review that you write as an individual for one other group. 5% for your individual participation in the group, assessed by Richard and/or Andrew based on your editing and comments in the wiki (quality, not quantity!); and also by your team mates and yourself.</p>
<p>Due date:</p>	<p>The project has several stages.</p> <ol style="list-style-type: none"> 1. You must meet with your group, and submit your topic and work plan in the wiki by Monday, August 8 at 12 midday (week 3). 2. You must have a draft of the project ready by Monday, September 5 at 12 midday (week 7). 3. You must provide review comments on your allocated project by Monday, September 12 at 12 midday (week 8). 4. The final project must be submitted by Monday, September 19 at 12 midday (week 9) <p>Failure to meet a deadline will incur a penalty of 5% per day. Projects can be submitted any time before the deadline.</p> <p>Selected projects will be asked to provide an informal overview in class discussion in week 10.</p>
<p>How to submit:</p>	<p>All work will be done within the OU wiki in Moodle. The wiki page will have detailed instructions, and links to good examples from previous years.</p> <p>Topic choice is indicated by creating a new wiki page that contains</p> <ul style="list-style-type: none"> • the topic title • the names and student numbers of the group members • a link to the selected media item • a work plan covering the division of labour and deadlines • a labelled photo as evidence of a face-to-face planning meeting. • The media item can be text, audio, video or whatever, but must not run more than 15 minutes for audio/video or be longer than 1000 words for text. If you want to exceed these limits, you must obtain permission from Drs Vickery & Moorhouse.

	<p>Project draft will be the state of your wiki page at the due date. Within the constraints of the site, you have freedom over the layout your project.</p> <p>Project review comments should be made on the page you were assigned to review. You will be assigned a group to review by Richard and/or Andrew.</p> <p>Final Project will be the state of your wiki page at the due date. It should include a section indicating the alterations made in response to the reviewers' feedback.</p> <p>Contact Richard.Vickery@unsw.edu.au if you have any problems.</p>
Word limit:	2500 words, excluding tables, figures and legends, references, and appendix.
Format for project:	<p>Create a wiki entry in the OU Moodle Wiki in the Assessments section of the Moodle course that:</p> <ol style="list-style-type: none"> 1. introduces the online media item that you have chosen; 2. explains the neuroscientific context of the item; 3. analyses the quality of information in the media item; 4. includes an appendix that details the search strategy by which you identified the supporting evidence you used in your analysis, and also spells out and justifies changes made to the draft in response to the reviewers' feedback. <p>1. The Introduction should briefly describe the nature of the media item that you have chosen (clinical case, research data, advertisement, documentary excerpt etc) and then explain why it is of interest, and what areas you will be discussing.</p> <p>2. The neuroscientific context is the background needed to appreciate the media item -a summary of the state of key current knowledge relevant to the item. It may be necessary to focus on only one aspect of a media item in order to stay within the word limit. If the item has ethical or social impacts that are broader than just neuroscience, they should be discussed here too, but there must also be some neuroscience content.</p> <p>3. In the analysis section you should identify the target audience of the media item, determine whether the information is pitched appropriately and in an unbiased manner, and then finally assess the quality of information in the item, especially as to whether it is in accord with accepted current understanding in neuroscience.</p> <p>4. The appendix should explain your search and selection strategy for all resources that you used. The mark for this section will in part reflect the range and quality of your sources, and how well you managed the referencing. All cited materials should be read. About 10-20 different articles or other resources is appropriate, and selecting which are the most relevant resources is important. The appendix should also summarise the reviewers' comments and detail how these concerns were either addressed or dismissed.</p>
Format for the review of another project:	<p>Feedback should be in the following format:</p> <ol style="list-style-type: none"> 1. strong points 2. weak points 3. general suggestions for improvement (e.g. logic, complexity, content, figures) 4. specific suggestions for improvement (e.g. typos, grammar, labels) <p>A short paragraph or a few dot points is required on each of these four areas. Try to be constructive and insightful, and comment on the neuroscience as well as the grammar and layout.</p>

Week	Lecture: Mon 3-4	Lecture: Thu 10-11	Lab / Tutorial: Fri 9-12 or Fri 1-4	
Module 1. Neurotrauma				
week 1 begins 25 / 7	CNS anatomy <i>Thomas Fath</i> Mathews A - 25/7 1500	Neurotrauma types <i>Nicole Jones</i> Mathews B - 28/7 1000	Lab: Gross anatomy, museum specimens, histology. <i>Thomas Fath & Nicole Jones & Dave, Chanchanok & Ashor</i> WW 101E - 29/7 0900 or 1300	
week 2 begins 1 / 8	Vascular & hypoxic neurotrauma <i>Nicole Jones</i> Mathews A - 1/8 1500	Mechanical neurotrauma <i>Thomas Fath</i> Mathews B - 4/8 1000	Tute: Neuronal death and recovery <i>Thomas, Nicole & Bruno Dampney</i> Mathews 308, 311, 313 - 5/8 1000 or Mathews 310, 312, 313 - 5/8 1400	
Module 2. Epilepsy				
week 3 begins 8 / 8	Introduction to brain electricity <i>Andrew Moorhouse</i> Mathews A – 8/8 1500	Overview and clinical perspectives <i>Ernie Somerville</i> Mathews B - 11/8 1000	*Lab: EEG recording and seizure activity <i>Andrew Moorhouse, Dave, Chanchanok & Ashor</i> Wallace Wurth 120 - 12/8 0900 or 1300	submit project plan Mon 5pm
week 4 begins 15 / 8	Genetics of epilepsy <i>Peter Schofield</i> Mathews A - 15/8 1500	Current and novel drug treatments <i>Margaret Morris</i> Mathews B - 18/8 1000	Tute: Cellular basis of epilepsy <i>Chelsea Goulton & Andrew Moorhouse</i> Mathews 312 - 19/8 1000 or Mathews 102 - 19/8 1400	
Consolidation / Review / Activities				
week 5 22 / 8	Neuroscience Careers <i>Andrew & Richard</i> Mathews A – 22/8 1500	Written Exam Practice <i>Andrew & Richard</i> Mathews B - 25/8 1000	*Project Group Work <i>Andrew & Richard</i> Wallace Wurth 120 - 26/8 0900 or 1300	
Module 3. Psychophysiology of Cognitive Disorders				
week 6 begins 29 / 8	Real-time neural measurements <i>Richard Vickery</i> Mathews A - 29/8 1700	Cognitive Assessments of Neural Activity?? <i>Donel Martin</i> Mathews B - 01/09 1000	Lab: The nervous system and the measurement of its electrical activity <i>Jacqueline Rushby</i> <i>Dave, Chanchanok & Ashor</i> Wallace Wurth 120 - 02/09 0900 or 1300	
week 7 begins 5 / 9	Clinical applications of physiol. measurements <i>Jacqueline Rushby</i> Mathews A - 05/09 1700	Clinical applications of neuro/biofeedback <i>Jacqueline Rushby</i> Mathews B - 08/09 1000	Tute: Detection of Deception <i>Jacqueline Rushby</i> Mathews 312 – 09/09 1000 or Mathews 102 – 09/09 1400	
Module 4 Neuroplasticity.				
week 8 begins 12 / 9	Learning and Memory <i>John Power</i> Mathews A - 12/9 1700	Animal models of learning <i>Asheeta Prasad</i> Mathews B - 15/9 1000	*Lab: Conditioning and remapping <i>John Power & Asheeta Prasad</i> <i>Dave, Chanchanok & Ashor</i> Wallace Wurth 120 - 16/9 0900 or 1300	submit final project Mon 5pm
week 9 begins 19 / 09	Neural modification <i>John Power</i> Mathews A - 19/09 1700	Dissecting neural circuits for learning <i>Asheeta Prasad</i> Mathews B - 22/09 1000	Tute: Of Mice and Men <i>John Power & Asheeta Prasad</i> Mathews 312 - 23/09 1000 or Mathews 102 - 23/09 1400	
26/9 to 2/10 Semester Break (1 week)				
Consolidation / Review / Activities (Draft)				
week 10 3 / 10-	Public Holiday	Exam Revision Feedback <i>Andrew & Richard</i> Mathews B – 06/10 1000	*Wiki Review & Presentations <i>Andrew & Richard</i> Wallace Wurth 120 – 07/10 0900 or 1300	
Module 5. Stress				
week 11 begins 10 / 10	Peripheral nervous system and stress <i>Pascal Carrive</i> Mathews A – 10/10 1700	Central nervous system and stress <i>Pascal Carrive</i> Mathews B – 13/10 1000	*Lab: Stress measured in humans using ELISA and thermal imaging <i>Natasha Kumar & Pascal Carrive</i> <i>Dave, Chanchanok & Ashor</i> Wallace Wurth 120 - 14/10 0900 or 1300	
week 12 begins 17 / 10	Psychology of stress <i>Gavan McNally (tbc)</i> Mathews A - 17/10 1700	How to treat stress <i>Natasha Kumar</i> Mathews B - 20/10 0900	Tute: Systems and management <i>Gavan (tbc) & Pascal</i> Mathews 312 - 21/10 1000 or Mathews 102 - 21/10 1400	