FACULTY OF MEDICINE & FACULTY OF SCIENCE

SCHOOL OF MEDICAL SCIENCES & SCHOOL OF PSYCHOLOGY

NEUROSCIENCE FUNDAMENTALS

NEUR2201

SESSION 2, 2015

An introductory multi-disciplinary course in neuroscience delivered by Anatomy, Health & Exercise Science, Physiology, Pharmacology, Psychology

COURSE OUTLINE

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 six fortnight-long modules, each taught by members of at least two 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.

CONTENTS

Course staff

Course Convenors

Course Convenor	Dr Richard Vickery room 303, third floor Wallace Wurth Building (turn right out of the lifts, and press the buzzer outside door 3NW) phone 9385 1676 e-mail Richard.Vickery@unsw.edu.au
Co-convenor & Examiner	A/Prof Matthias Klugmann TNF, third floor Wallace Wurth building (turn left out of the lifts, and press the buzzer outside door 3SW) phone 9385 1056 e-mail m.klugmann@unsw.edu.au

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Prof. Ernie Somerville		Neurology

Consultations

Dr Vickery & Dr Klugmann 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.

Enrolment assistance can be obtained from the BSB Student Office, G27, BioSciences building.

Course information

Course Structure and Teaching Strategies

Units of credit: This is 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 plus 15 minute quiz per fortnight

Class Times and Locations:

Lectures are one hour long, at 3pm on Monday in Webster Theatre B, and at 12 noon on Tuesday in Electrical Engineering Theatre G25.
Tutorials which run every second week are generally 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 run in the alternate weeks to the tutorials are generally 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 http://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.

Attendance Requirements & Special Consideration

Attendance at practical classes and tutorials is compulsory, and may be recorded in the class roll on the day of the class. Satisfactory completion of the work set for each class is essential. Failure to attend practical classes and tutorials for other than documented medical or other serious reasons, or unsatisfactory performance, may result in an additional assessment or ineligibility to pass the course.

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. 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.

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 **25%**
- On-line multiple choice assessments **5%**
- Group project *Neuroscience in the Media* **25%**
- Final exam **45%**

Each fortnight-long module has a short quiz at the end, run in the tutorial slot. These quizzes are done online, in class, and take about 15 minutes to complete. A variety of forms of assessment are used in the quizzes including labelling figures, filling gaps in text, and completing a crossword. These quizzes provide immediate feedback on your progress, and review content that will be covered in the short-answer questions of the final exam.
Three sets of multiple choice questions (one per two modules) will provide an opportunity to practice for the sorts of questions in the 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 six short answer questions (one per topic) of which you are required to answer four. The fortnightly quizzes and online multiple choice assessment are similar in format to the two types of question in the final exams.

Academic Honesty and Plagiarism

Students should be aware of UNSW's policy on academic and student misconduct:
https://student.unsw.edu.au/plagiarism
Student assignments may be submitted to the Turnitin plagiarism detection engine.

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
Saunder

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. You are invited to provide online anonymous course feedback via Moodle throughout the session to enable immediate response. The end-of-session Course and Teaching Evaluation and Improvement [CATEI] process of UNSW is another way in which student feedback is evaluated, and we ask your assistance in completing this survey 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 2013 and gave generally very positive feedback. For the question, “Overall I was satisfied with the quality of this course”, there were 39% strongly agree and 52% agree.

Here are some sample comments:

- *The weekly quizzes were great because they kept me up to date with what I was learning. The labs were very hands on and interactive. The course is structured in such a way that we are learning a new topic every 2 weeks which was a great approach. This is probably one of the best courses that I have done in my degree so far.*

- *The topics that were chosen were interesting and intriguing. The lecturers were experts in their field and were able to give a lot of new, and often original, information.*

- *Some topics in this course could be shifted around. Neurotrauma should be the first topic that we had because we were learning about the histology of the brain. Learning about the histology first would be better than learning it in the middle of the course.*

- *Making the labs and tutorials more efficient and also the objectives of these clearer. More support for the lab material would be great to explain to us better what we were doing and why.*

The course has been modified for 2015 as follows.

1. We have reorganised the course to make Neurotrauma the first module.
2. We have a printed prac manual to allow students to better prepare for the labs.
3. We have split the labs and tutorials into two streams to reduce pressure on demonstrators and should ensure that prac classes run more smoothly.

Administrative Information

The following page provides general student information
http://medicalsciences.med.unsw.edu.au/students/undergraduate/advice-students

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, who is the Program Authority for Neuroscience, if you would like more information on further study options.

Online Group Project Assessment Task Guidelines

Neuroscience in the Media - WIKI ASSESSMENT TASK

Requirement:	You will work in a group of four students to identify an online media item (such as a YouTube video, advertisement, or newspaper article) in the area of neuroscience. As a group you will prepare a wiki page detailing the neuroscientific context and evaluating the quality of information in the media item. As an individual you will provide editorial review to another group's project.
Contribution to assessment:	The group online project assessment will contribute **25% to your final mark** for the course. The mark break-down is as follows: **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 Dr Vickery based on your editing and comments in the wiki; and also by your team mates and yourself.
Due date:	The project has several stages. 1. You must form your group, and submit your topic and work plan in the wiki by **Monday, August 10 at 5pm**. 2. You must have a draft of the project ready by **Monday, September 7 at 5pm.** 3. You must provide review comments on your allocated project by **Monday, September 14 at 5pm.** 4. The final project must be submitted by **Monday, September 21 at 5pm**. Failure to meet a deadline will incur a penalty of 5% per day. Projects can be submitted any time before the deadline.
How to submit:	All work will be done within the OU wiki in Moodle. **Topic choice** is indicated by creating a new wiki page that contains • 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 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 Dr Vickery. **Project draft** will be the state of your wiki page at the due date. Within the constraints of the site, you have freedom over how the layout your project.

	Project review comments should be made on the page you assigned to review. You will be assigned a group to review by Dr Vickery. **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. Contact Richard.Vickery@unsw.edu.au if you have any problems.
Word limit:	2500 words, excluding tables, figures and legends, references, and appendix.
Format for project:	Create a wiki entry in the OU Moodle Wiki in the Assessments section of the Moodle course that: 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. 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. 2. The neuroscientific context is where you provide the background to appreciate the media item by summarising the state of current knowledge relevant to the item. Sometimes 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. 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. 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. It should also summarise the reviewers' comments and detail how these concerns were addressed or dismissed.
Format for the review of another project:	Feedback should be in the following format: 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) A short paragraph or a few dot points is required on each of these four areas. Try and be constructive and insightful, and comment on the neuroscience as well as the grammar and layout.

Course Schedule

Week	Lecture: Mon 3-4	Lecture: Tue 12-1	Lab / Tutorial: Fri 9-12 or Fri 1-4
	Neurotrauma		NEUR2201 timetable 2015.1.doc 19/06/2015
week 1 27 / 7	**CNS anatomy** *Thomas Fath* Webster B - 27/7 1500	**Neurotrauma types** *Nicole Jones* Elec Eng G25 - 28/7 1200	**Lab: Gross anatomy, museum specimens, histology.** *Thomas Fath & Nicole Jones & Dennis, Dave, Juan* WW 101E - 31/7 0900 or 1300
week 2 3 / 8	**Vascular & hypoxic neurotrauma** *Nicole Jones* Webster B - 3/8 1500	**Mechanical neurotrauma** *Thomas Fath* Elec Eng G25 - 4/8 1200	**Tute: Neuronal death and recovery** *Nicole Jones & AndrewT & Bruno* Mathews 112, 113, 302 - 7/8 1000 or Mathews 301, 302, 420 - 7/8 1300
	Epilepsy		
week 3 project plan 10 / 8	**Introduction to brain electricity** *Chelsea Goulton* Webster B – 10/8 1500	**Overview and clinical perspectives** *Ernie Somerville* Elec Eng G25 - 11/8 1200	**Lab: EEG recording and seizure activity** *RichardV, Chelsea & Dennis, Dave, Juan* Wallace Wurth 120 - 14/8 0900 or 1300
week 4 17 / 8	**Genetics of epilepsy** *Peter Schofield* Webster B - 17/8 1500	**Current and novel drug treatments** *Margaret Morris* Elec Eng G25 - 18/8 1200	**Tute: Cellular basis of epilepsy** *Andrew Moorhouse & Richard Vickery* Mathews 312 - 21/8 1000 or Mathews 102 - 21/8 1300
	Psychophysiology of Cognitive Disorders		
week 5 24 / 8	**Real-time neural measurements** *Eric Han* Webster B - 24/8 1500	**Applied psychophysiology** *Jacqueline Rushby* Elec Eng G25 - 25/8 1200	**Lab: The nervous system and the measurement of its electrical activity** *Jacqui Rushby & Dave, Juan, AndrewC* Wallace Wurth 120 - 28/8 0900 or 1300
week 6 31 / 8	**Clinical applications of physiol. measurements** *Jacqueline Rushby* Webster B - 31/8 1500	**Clinical applications of neuro/biofeedback** *Jacqueline Rushby* Elec Eng G25 - 1/9 1200	**Tute: Detection of Deception** *Jacqueline Rushby* Mathews 312 - 4/9 1000 or Mathews 102 - 4/9 1300
	Multiple Sclerosis		
week 7 project draft 7 / 9	**Measuring Axonal conduction** *Richard Vickery* Webster B - 7/9 1500	**Living with MS** *Maria Sarris* Elec Eng G25 - 8/9 1200	**Recording from human axons: carpal tunnel lab** *Richard Vickery & Dennis, Dave, Juan* Wallace Wurth 120 - 11/9 0900 or 1300
week 8 project review 14 / 9	**Causes & management of MS** *Ria Arnold* Webster B – 14/9 1500	**Novel Therapeutic Approaches** *Matthias Klugmann* Elec Eng G25 – 15/9 1200	**Tute: Relapse and remit** *Ria Arnold & Matthias Klugmann* Mathews 312 - 18/9 1000 or Mathews 102 - 18/9 1300
	Neuroplasticity		
week 9 project final 21 / 9	**Learning and Memory** *John Power* Webster B - 21/9 1500	**Models of learning** *Amy Reichelt* Elec Eng G25 - 22/9 1200	**Lab: Conditioning and remapping** *John Power & Amy Reichelt & Dennis, Dave, Juan* Wallace Wurth 120 - 25/9 0900 or 1300
28 / 9	mid -	session	break (two weeks)
week 11 12 / 10	**Neural modification** *John Power* Webster B - 12/10 1500	**Regulating plasticity** *Amy Reichelt* Elec Eng G25 - 13/10 1200	**Tute: Of Mice and Men** *Amy Reichelt* Mathews 312 - 16/10 1000 or Mathews 102 - 16/10 1300
	Stress		
week 12 19 / 10	**Peripheral nervous system and stress** *Pascal Carrive* Webster B - 19/10 1500	**Central nervous system and stress** *Pascal Carrive* Elec Eng G25 - 20/10 1200	**Lab: Stress measured in humans using ELISA and thermal imaging** *Lu Liu & P Carrive & Dennis, Dave, Juan* Wallace Wurth 120 - 23/10 0900 or 1300
week 13 26 / 10	**Psychology of stress** *Matthias Klugmann* Webster B - 26/10 1500	**How to treat stress** *Lu Liu* Elec Eng G25 - 27/10 1200	**Tute: Systems and management** *Pascal Carrive* Mathews 312 - 30/10 1000 or Mathews 102 - 30/10 1300