



Faculty of Medicine & Faculty of  
Science

School of Medical Sciences  
& School of Psychology

# NEUR2201

## Neuroscience Fundamentals

COURSE OUTLINE

TERM 2, 2020

CRICOS Provider Code 00098G

# WELCOME

Welcome to Neur2201 2020 – Remote Mode. On behalf of the convenors Andrew & Jennie, and the staff from the Schools of medical Sciences and Psychology, we hope you enjoy the course this trimester, find it a valuable learning experience and that you and your friends and family stay well.

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 focussed on one of the last great frontiers of knowledge – understanding the brain.

The course is structured into an Introductory week and then four, fortnight-long modules, each taught by members of two or more different neuroscientific disciplines. Each module includes a series of lectures by discipline experts, a practical experience, and a tutorial and progress assessment. This format allows us to tackle some “big questions” in neuroscience. We hope that you find the course as exciting and fulfilling as we find our own engagement in the research, study and practice of neuroscience.

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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 [medicallsciences.med.unsw.edu.au](http://medicallsciences.med.unsw.edu.au) )

# COURSE STAFF

## Course Convenors

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Course

Convenor

A/Prof Andrew Moorhouse

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Co-Convenor

Dr Jennie Cederholm

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## PrimaryTutors

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AndrewMoorhouse

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Jennie Cederholm

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## Other Teaching Staff

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*UNSW Sydney*

Live and Recorded Lectures or other Learning Activities from Staff in the Schools of Medical Science and Psychology, that includes:

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*Affiliated Institutes / Hospitals and Externals*

Dr Hanka Laue-Gizzi

Prince of Wales Hospital, Neurology

## Consultations

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A/ProfMoorhouse& Dr Cederholm are happy to be approached for academic and administrative matters concerning the course. Please arrange an appointment by email, copying both into the email.

The Education Support Team is available to help with problems with enrolment and scheduling, and should be the first point of contact for administrative problems. Please contact them through <http://unsw.to/webforms>

# COURSE INFORMATION

## Course Structure and Teaching Strategies

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**Overview:** Neuroscience Fundamentals (NEUR2201) is a stage two course worth six units of credit (6 UOC) administered by the School of Medical Sciences. It is delivered across 9 teaching weeks in term 2, with synchronous and asynchronous teaching equivalent to about six hours per week. NEUR2201 can be undertaken upon successful completion of 12 units of background courses in BABS, BIOS or PSYCH, with many students completing the useful background courses: ANAT2511 BIOC2101 PHSL2101 and/or PSYC2081. The course is a compulsory part of the Neuroscience study plan in Advanced Science (NEURA13972) and in Science (NEURS13970) but is open to other students interested in Neuroscience. In 2020, NEUR2201 will commence in week 1, from Monday 1st June, and finish in Week 10, Thurs 6<sup>th</sup> August

### Course Structure & Class Times & Locations:

***Please note the teaching structure is different from prior years due to COVID-19 pandemic and is subject to some changes as we continue to develop the revised structure with contributing staff. We will run the course with a combination of asynchronous and synchronous online activities. As per UNSW guidelines, there are no face to face activities.***

Four two-week modules around a topic in Neuroscience. Each fortnightly module typically consists of

- Asynchronous Online Lectures or Mini-Lectures combined with synchronous (live) Blackboard Collaborate revision/ Q & A session. We aim for this to be equivalent to the traditional structure of 4 x 1hr face to face lectures with some time to chat to lecturers between and after classes. The live Q&A session will be either in the last 30 mins of the rostered Monday afternoon time slot, or at a more suitable time as pre-arranged. Students will be notified of the live session times via Moodle.
- One practical activity to substitute for what was previously a 3 hour practical class related to that fortnight's topic. This year we will have asynchronous activities with an online live tutorial follow up. Activities will range from focus on specific techniques with practicing scientists, to analysing previous data, through to online prac simulations. Brief details are in the timetable and further descriptions on Moodle.
- A 2 or 3 hour synchronous tutorial on every other Tuesday (10-1 am, or 2-5 pm) run via Blackboard collaborate. Tutes comprises a variety of activities aiming to re-inforce or complement the module theme, and includes review or revision of the module content.
- A fortnightly progress assessment using synchronous on-line (Moodle) quiz, held on Thursday at the end of each Module, at 4pm-6 pm.
- Week 1 is an Introductory module on the Core elements of the Brain, with 2 Online Asynchronous lectures, an online practical class activities and a synchronous summative assessment task.

**Self-Study hours:** Students are expected to allocate an additional six hours per week for self-directed learning, which includes revision for assessments and working on the group project task.

**Please consult Moodle for more detail on each Module and its teaching activities, and for any updates**

## Course schedule

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The best place to see the latest course timetable is on the NEUR2201 Moodle website. A current draft schedule is at the end of these outlines, but subject to minor changes.

## Ethics for Practical Classes

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Although students are not directly involved in face-to-face prac classes with animal or human subjects, students will be reviewing data obtained from such pracs, or engaging with Neuroscientists whom have obtained data from such practical classes. It is important to appreciate that all experiments reviewed in the practical classes involving the use of animal or human specimens have been conducted with approval from UNSW or equivalent ethics committees and adhere to the [Australian code of practice for the care and use of animals for scientific purposes](#), and the [National Statement of Ethical Conduct in Human Research](#)

Please see Moodle for details and Resources about each practical class. A brief description of practical activities is in the timetable.

## Approach to learning and Teaching

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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 inform on the research techniques and analytical skills related to the topic. 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. Online tutorials and review sessions allow more interactive learning. A large part of the learning and teaching approach is working with your peers on neuroscience related topics.

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

Students are expected to attend 100% of the synchronous tutorials and assessment classes, and should provide the convenors a Medical certificate or similar supporting information when this is not possible. Class rolls will be marked in the tutes.

# Aims of the Course and Student Learning Outcomes

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The overall aim of the course is to introduce students to the study of Neuroscience through a focus on current Neuroscience topics. Each topic is approached from different discipline perspectives, and from a scale ranging from molecular and cellular processes, through to the level of the whole animal. We aim for this course to provide a solid introduction to neuroscience that will facilitate further study in discipline focussed, more advanced, Neuroscience subjects.

## ***Student learning outcomes***

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

1. A knowledge of the broad scope of neuroscience as demonstrated by communicating examples of how different disciplines contribute to the study of a common challenge in Neuroscience
2. An understanding of the major cellular and whole animal features of the five modules – The Big Brain, Epilepsy, Stress, Neuroplasticity and Motor Control Disorders. This understanding should be demonstrated by being able to communicate a basic description of the relevant aspect of normal brain function and how it is affected in the disease state leading to the disease symptoms.
3. An insight into the methods by which problems in neuroscience are investigated that includes a basic description of questions that may be addressed by such approaches and some limitations on the interpretations of this experimental data.
4. Experience and expertise in locating and appraising information related to neuroscience and succinctly presenting conclusions related to these enquiries. This expertise is demonstrated by being able to integrate media and scientific literature around a specific Neuroscience topic and presenting these conclusions in written and oral form.
5. Skills in working collaborately within a small group on a common Neuroscience project that is demonstrated by identifying strengths and weaknesses related to your teamwork experience and by producing a coherent and well integrated group project

## ***Graduate attributes developed in this course***

### **UNSW programs aspire to graduate:**

- a) **Scholars** capable of independent and collaborative enquiry, rigorous in their analysis, critique and reflection, and able to innovate by applying their knowledge and skills to the solution of novel as well as routine problems;
- b) **Entrepreneurial leaders** capable of initiating and embracing innovation and change, as well as engaging and enabling others to contribute to change;
- c) **Professionals** capable of ethical, self- directed practice and independent lifelong learning;
- d) **Global citizens** who are culturally adept and capable of respecting diversity and acting in a socially just and responsible way.

# ASSESSMENT

## Assessment tasks

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1) Ongoing on-line assessment quizzes	20%
2) Short answer practice & peer marking	20%
3) Group project <i>Neuroscience in the Media</i>	30%
4) Final exam	30%

1) Each module has a short quiz at the end of the fortnight, run during the Thursday afternoon assessment class. These quizzes are done online, and take about 15 minutes to complete. A variety of forms of assessment are used in the quizzes including multiple choice, single word answers, labelling figures and filling gaps in text. There are five quizzes, your assessment is based on the best four of these. These quizzes also help you keep up to date on the content and may include material from lectures, tutorials and practical activities.

This assessment item addresses the course learning objectives 1, 2 & 3

Immediate feedback is given, providing an indication on your level of study and understanding of the content from lectures, tutes and practical classes in the preceding module

2) To give you some experience with the written question format of the final exam we will have in-class short answer questions (SAQs) at the end of each module. This will be peer-marked using a provided marking scheme, and may also be marked again by the tutors. This helps you develop skills in critical evaluation. 50% of marks are allocated for your own answer, and 50% of marks allocated for your peer assessment (how close your score is to the tutors, and the justification of your score). Your assessment will again be based on the best four of the five assessments. These help you keep up to date on the content, and also provide some generic skills on communication and critical evaluation, and practice in answering the SAQs in the final exam.

This assessment item addresses the course learning objectives 1, 2 & 3

Peer review enables you to get immediate feedback on short answer writing and on your own answer. You can flag your peer marker to be reviewed by the tutors, if you disagree strongly with their mark.

3) The group project comprises submission of a group Wiki page on a Neuroscience topic of your choice, presentation of a summary of this topic to the class, reflection on teamwork, and participation in critical appraisal of a peer's Wiki. The details of the various components are described in detail in the Wiki link on Moodle.

This assessment item addresses the course learning objectives 4 & 5

Feedback on your Wiki will be provided by the end of Week 10 and you will get immediate feedback from peers and tutors during your presentation

4) 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 short answer Qs are similar in format to the practice written exams. This is an online exam via Inspira or Moodle.

This assessment item addresses the course learning objectives 1, 2 & 3.

The final exam will be held some time between **16-31<sup>st</sup> August**

Marks will be incorporated into a final grade and released by UNSW

Any assessments not completed on the due dates will be marked as zero unless special consideration is granted. For assessments 1 and 2, this is typically via an estimate based on your ranking in completed assessments. For the final and progress quizzes, this is typically in the form of a supplemental exam.

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Supplementary Final Exam, if granted, will be 7<sup>th</sup>-11<sup>th</sup> September

# TEXTBOOKS AND READING LIST

## **Textbook:**

Neuroscience: Exploring the Brain 3<sup>rd</sup> 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 4<sup>th</sup> 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; Saunderson

Neuroscience; Purves, Augustine, Fitzpatrick et al.  
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The books are available from the UNSW Bookshop, and are held by the UNSW library.

## **Special Consideration**

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If you fall ill prior to, or during, an assessment you may be eligible for Special Consideration. This is now managed centrally, so please see this link for details:

<https://student.unsw.edu.au/special-consideration>

The course convenors no longer have input into the special consideration process. If your request for consideration is granted, a supplemental assessment may be organised, or increased weighting may be applied to completed assessments. If you miss the final exam, a supplementary exam (to be held between the 7<sup>th</sup> & 11<sup>th</sup> of September 2020) may be granted.

## **Student Policies and Resources**

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Please see <https://medicallsciences.med.unsw.edu.au/students/undergraduate/advice-students>

## **Student Administrative Matters**

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Please direct all enquiries via the UNSW Student Portal Web Forms

<https://unswinsight.microsoftcrmpportals.com/web-forms/>

## **Further Study**

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

**T2, 2020, Remote Teaching Timetable (subject to changes – latest timetable always on Moodle)**

Week No. Commencing	LECTURES (2 x1hr / week) Asynchronous Online with follow up Live Online Stream Q & A <u>Live stream, Mondays 5:30-6pm or tbc</u>		Asynchronous PRAC Activities (odd weeks) or LIVE TUTORIALs (even weeks) <u>Tuesdays 10-1pm; 2-5pm</u>	ASSESSMENT Activity Live Online, Thursday 4pm - 6:00 pm (weeks 1,3,5,8,10)
1 01 June	<b>Module 1. Intro to the Brain</b> <b>L1 –Structure- Neurons, Glia and Circuits</b> Andrew Moorhouse (SOMS)	<b>L2 – Function – Signaling&amp; Synapses</b> Andrew Moorhouse (new online)	<b>Practical 1. Lab: NeuroAnatomy&amp; Histology.</b> (Synchronous; Two x Live Streaming BBC sessions, Also recorded. Anatomy)	<b>Intro to Assessment activities and peer marking</b> <b>Module 1 Quiz &amp; SAQ</b> (Live, Andrew & Jennie)
2 8 June (pub hol on Monday 8th)	<b>Module 2 Epilepsy (AM)</b> <b>L3 – Introduction to Epilepsy &amp; Cellular Excitability</b> Andrew Moorhouse (SOMS)	<b>L4 – Clinical Aspects of Epilepsy</b> Hanke Laue Gizzi (POWCS)	<b>Practical 2. Electrical Activity in the Brain</b> (Asynchronous, Working with Neuroscientists Series, Video interviews)	Wiki Topic Plan submission
3 15 June	<b>L5 – Epilepsy Research: Models &amp; Techniques</b> Chelsea Goulton (SOMS)	<b>L6 – Current &amp; Novel Treatments for Epilepsy</b> Chelsea Goulton (SOMS)	<b>Tut 1 – ILAE – Epilepsy Syndromes Worksheet / Wiki Q&amp;A</b> (Live, Andrew & Jennie)	<b>Module 2 Quiz &amp; SAQ,</b> (Live, Andrew & Jennie)
4 22 June	<b>Module 3 Stress (PC)</b> <b>L7 –Neural substrate of Stress – Peripheral Nervous System</b> Pascal Carrive (SOMS)	<b>L8 –Neural substrate of Stress – Central Nervous System</b> Pascal Carrive (SOMS)	<b>Practical 3. Stress in humans &amp; its measurement</b> At home & asynchronous activities Pascal Carrive, tbc	
5 29 June	<b>L9 – Stress &amp; the HPA axis</b> Kelsey Zimmerman (Psych)	<b>L10 – Management &amp; Treatment of Stress</b> Natasha Kumar (SOMS)	<b>Tut 2 – Stress &amp; Mindfulness, what makes a good scientific study</b> (Live, Andrew & Jennie)	<b>Module 3 Quiz &amp; SAQ</b> (Live, Andrew & Jennie)
6 06 July	<b>Flexi Week.</b> Student encouraged to undertake some revision and work on Wikis. We will schedule specific revision tutes and Q&As as required			
7 13 July	<b>Module 4 Neuroplasticity (JP)</b> <b>L11– Synapses, Circuits &amp; Plasticity</b> John Power (SOMS)	<b>L12– Learning &amp; Memory Mechanism</b> Asheeta Prasad (Psych)	<b>Practical 4. – Neuroplasticity</b> Asynchronous, Working with Neuroscientists Series, Video interviews	Wiki Page Submission
8 20 July	<b>L13 – Cellular Mechanisms of Plasticity</b> John Power (SOMS)	<b>L14 – Modulation of Learning &amp; Memory</b> Asheeta Prasad (Psych)	<b>Tut 3 - Wiki Presentations</b> (Live, Andrew & Jennie)	<b>Module 4 Quiz &amp; SAQ</b> (Live, Andrew & Jennie)
9 27 July	<b>Module 5 MND (AM)</b> <b>L15 – Motor Neurons &amp; Motor Control</b> Ingvars Birznieks (SOMS)	<b>L16 – Myelin &amp; Nerve Conduction</b> Andrew Moorhouse (SOMS)	<b>Practical 5. – Multiple Sclerosis</b> Asynchronous, Online simulation using Neurons in Action, accessed via MyAccess	Wiki Teamwork Submission
10 03 August	<b>L17 – Treatment of spinal muscular atrophy</b> Andrew Moorhouse (SOMS)	<b>L18 – Motor control disorders</b> Ingvars Birznieks (SOMS)	<b>Tut 4 - Justin Yerbury Story / Ethics of Drug Access / Prac summary</b> (Live, Andrew & Jennie)	<b>Module 5 Quiz &amp; SAQ</b> (Live, Andrew & Jennie)