



Faculty of Medicine & Health

School of Medical Sciences

NEUR2201

Neuroscience Fundamentals

COURSE OUTLINE

TERM 2, 2021

CRICOS Provider Code 00098G

WELCOME

Welcome to NEUR2201 2021 – Blended Mode. On behalf of the convenors, Jennie and Georg, 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, 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, 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 medicalsciences.med.unsw.edu.au)

COURSE STAFF

Course Convenors

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Other Teaching Staff

UNSW Sydney

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Consultations

Dr Cederholm is happy to be approached for academic and administrative matters concerning the course. Please arrange an appointment by 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

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 36 UOC, which must include 12 units of background courses in BABS, BIOS or PSYC, 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 2021, NEUR2201 will commence in week 1, from Monday 31st May, and finish in Week 10, Friday 6th 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. In 2021, we will run the course with a combination of asynchronous and synchronous online, or face-to-face, activities. As per UNSW guidelines, all lectures will be delivered online, and face-to-face activities require a face mask.

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

- **Synchronous (live) and Asynchronous pre-recorded onlinelectures combined with synchronous (live) revision/Q&A sessions.** We aim for this to be equivalent to the traditional structure of 4 x 1-hour face-to-face lectures with some time to chat to lecturers between and after classes. The live Q&A session is rostered on the Wednesday (5-6pm) lecture time slot in week 2 of each module. Students will be notified of the live session times via Moodle.
- **Face-to-face practical activity.** A 3-hour practical class related to that fortnight's topic on every other Tuesday (10-1pm, or 2-5pm). Activities will range from focus on specific techniques with practicing scientists, brain slides, to analysing data, through to online prac simulations. Details and further descriptions are on Moodle.
- A 3-hour **face-to-face tutorial** on every other Tuesday (10-1pm, or 2-5pm). Tutorials comprise a variety of activities aiming to re-inforce or complement the module theme, and includes review or revision of the module content.
- A 1-hour fortnightly **face-to-face progress assessment** using online (Moodle) quiz or Inspira and (Moodle) workshop tool, held on Fridays at the end of each Module (12-1pm, or 1-2pm).
- Week 1 is an **Introductory module** on the core elements of the brain, with one Synchronous (live) online lecture and one Asynchronous pre-recorded online lecture, a face-to-face practical class and a face-to-face formative progress assessment activity. A live Q&A session is also rostered on the Wednesday 2nd June, 5-6pm.

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.

Hybrid Learning Mode Pilot: NEUR2201 is taking part in this Pilot. More information is available on Moodle and will also be provided in the Week 1 Practical session.

Course schedule

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

Ethics for Practical Classes

Practicals involving the use of animal or human specimens are a privilege, and must be treated with respect and professionalism. 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](#). Students are expected to adhere to these codes and practices.

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.** These must completely cover the feet. Some labs will require lab coats. Punctual arrival is expected, and you are required to check-in using the Service NSW app once you enter the class. Practical classes that involve student participation may require the subject to sign a witnessed, informed consent form.

Please see Moodle and the Practical Lab Manuals for details and resources about each practical class and its Health and Safety requirements, and any pre-reading.

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 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. 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 assessments and exams and seeking assistance to clarify your understanding.

Students are expected to attend 100% of tutorials, practicals 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 tutorials, practicals and assessment activities.

Aims of the Course and Student Learning Outcomes

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. Demonstrate an **understanding** of the broad scope of neuroscience by communicating examples of how different disciplines contribute to the study of a common challenge in Neuroscience.
2. Demonstrate an **understanding** of the major cellular and whole animal features of the five modules. 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. Demonstrate **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. Demonstrate **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. Demonstrate **skills in working collaborately** within a small group on a common Neuroscience project 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

1) Ongoing face-to-face assessment quizzes	20%
2) Ongoing Short answer assessment & peer marking	20%
3) Group project <i>Neuroscience in the Media</i>	20%
4) Final exam	40%

1) Each module has a short quiz at the end of the fortnight, run during the **face-to-face Friday assessment class**. These quizzes are done online using Moodle quiz or Inspira, and take about 10 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 is **one formative quiz** at the end of the Introductory week to introduce you to the format and style of questions. There are **four summative quizzes** and your assessment is based on all 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, tutorials and practical classes in the preceding module.

Introduction to this assessment activity is scheduled during the practical in the Introductory week.

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, run during the **face-to-face Friday assessment class**. 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 are allocated for your peer assessment (how close your score is to the tutors, and the justification of your score). As with the quiz, there is **one formative SAQ** at the end of the Introductory week. There are **four summative SAQs**. Your assessment will again be based on all four of these 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.

Introduction to this assessment activity is scheduled during the practical in the Introductory week.

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 and Group Project E-book (under the Group Project tab) 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 multiple choice questions, and five SAQs (one per module topic), of which you are required to answer four. The SAQs are similar in format to the practice formative/summative SAQ assessments. This is an online exam via Moodle or Inspira.

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

The final exam will be held some time between **13-26th 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.

Supplementary Final Exam, if granted, will be 6th-10th September.

TEXTBOOKS AND READING LIST

Textbook:

Neuroscience: Exploring the Brain 4th edition
Mark F. Bear, Barry W. Connors, Michael A. Paradiso
Wolters Kluwer ISBN:9780781778176
(recommended for students continuing in neuroscience)

or

Neuroanatomy and Neuroscience at a Glance 5th edition
Roger A. Barker, Francesca Cicchetti, Emma S.J. Robinson
Wiley-Blackwell EISBN:9781119168423

Recommended reading:

Principles of Neural Science; Kandel, Koester, Mack, Siegelbaum; McGraw-Hill (6th edition)

Medical Physiology; Boron & Boulpaep; Elsevier (3rd edition)

Neuroscience; Purves, Augustine, Fitzpatrick et al. Oxford University Press (6th edition)

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

Special Consideration

UNSW has a **Fit to Sit/Submit rule**, which means that if you sit an exam or submit an assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration.

If you fall ill **prior** to an assessment you may be eligible for Special Consideration. If you fall ill **during** an exam to the point that you cannot continue your exam, you must stop working, tell a staff member and apply for Special Consideration.

Special Consideration is now managed centrally, so please see this link for details:

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

Student Policies and Resources

Please see <https://medicalsciences.med.unsw.edu.au/students/undergraduate/advice-students>
Equitable Learning Services: <https://student.unsw.edu.au/els>

Student Administrative Matters

Please direct all enquiries via the UNSW Student Portal Web Forms (unsw.to/webforms)

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

T2, 2021, Blended Teaching - Preliminary Timetable (subject to changes – latest timetable always on Moodle)

Week No. Commencing	LECTURES Synchronous (LIVE) Online Mondays 1-2pm	LECTURES Asynchronous Online (LIVE Q&A , Wednesdays 5-6pm, Week 2 of each module)	PRACTICALS or TUTORIALS Face-to-face Tuesdays 10-1pm & 2-5pm	ASSESSMENT Activity Face-to-face Fridays 12-1pm & 1-2pm
1 31 May	Module 1: Intro to the Brain (JC) Structure – neurons, glia & circuits Jennie Cederholm (SOMS)	Function – signalling & synapses Jennie Cederholm (SOMS) LIVE Q&A (5-6pm)	Practical 1: Intro to Assessment activities and peer marking; Anatomy & Histology (Jennie, Anatomy Team)	Module 1 Quiz & SAQ Formative (Jennie & Georg)
2 7 June	Module 2: Cortical maps & Organisation (RV) Sensory transduction and neural coding Richard Vickery (SOMS)	Real-time measurement of neural activity Richard Vickery (SOMS) Modular processing in vision Richard Vickery (SOMS)	Practical 2: Sensory/Cortical mapping (Richard & Jennie)	Wiki Topic Plan submission
3 14 June	PUBLIC HOLIDAY – NO LIVE LECTURE	Building cortical maps Richard Vickery (SOMS) LIVE Q&A (5-6pm)	Tut 1: Sensory/Cortical mapping / Wiki Q&A (Jennie & Georg)	Module 2 Quiz & SAQ Summative (Jennie & Georg)
4 21 June	Module 3: Stress (PC) Neural substrate of stress – Peripheral Nervous System Pascal Carrive (SOMS)	Neural substrate of stress – Central Nervous System Pascal Carrive (SOMS) Stress & the HPA axis Kelsey Zimmerman (Psyc)	Practical 3: Stress measured in humans (Pascal & Natasha)	
5 28 June	Management & treatment of stress Natasha Kumar (SOMS)	LIVE Q&A (5-6pm)	Tut 2: Stress & mindfulness, what makes a good scientific study (Jennie & Georg)	Module 3 Quiz & SAQ Summative (Jennie & Georg)
6 05 July	FLEXI WEEK - Students encouraged to undertake some revision and work on Wikis			
7 12 July	Module 4: Neuroplasticity (JP) Synapses, circuits & plasticity John Power (SOMS)	Learning and memory mechanisms Miriam Matamales (Psych) Cellular mechanism of plasticity John Power (SOMS)	Practical 4: Conditioning and Remapping (John & Miriam)	Wiki Page Submission
8 19 July	Modulation of learning & memory Miriam Matamales (Psych)	LIVE Q&A (5-6pm)	Tut 3: Wiki Presentations / Prac summary (Jennie & Georg)	Module 4 Quiz & SAQ Summative (Jennie & Georg)
9 26 July	Module 5: Motor Control & Neurotherapeutics (GvJ) Myelin & impulse propagation Georg von Jonquieres (SOMS)	Motor neurons & motor control Ingvars Birznieks (SOMS) Motor control disorders Ingvars Birznieks (SOMS)	Practical 5: Recording of sensory nerve conduction / Neurons in Action (Georg & Ingvars)	Wiki Teamwork Submission
10 02 August	Gene therapy approaches for neurological diseases Georg von Jonquieres (SOMS)	LIVE Q&A (5-6pm)	Tut 4: Modern drug development and access (Jennie & Georg)	Module 5 Quiz & SAQ Summative (Jennie & Georg)