



**Faculty of Medicine and Health
School of Medical Sciences**

ANAT3411

NEUROANATOMY

COURSE OUTLINE

TERM 1, 2021

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It is your responsibility to make sure that you read and sign the **Student Risk Assessment Form** included in this outline before you attend your first practical class in the Anatomy Laboratory. Keep the signed form in your Tut/Prac Manual and show it to your demonstrator at the beginning of the first practical class.

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)

COURSE STAFF

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COURSE INFORMATION

ANAT3411 Neuroanatomy is a 6 UoC (unit of credit) course.

The course consists of 6.5 hours per week of teaching (3 x 1 hr lectures 1x 2hrs tutorial class and 1 x 1.5 hr practical class). Lectures and tutorials will be delivered online. The practical classes will be delivered face-to-face in the Anatomy labs with social distancing until further advice from NSW health. Practical classes will not be delivered online, except in the event of a lockdown or for individuals having to quarantine because of the pandemic. In this case, practical labs will be converted to some form of online activities.

ANAT3411 Neuroanatomy is an advanced neuroscience course that provides students with an understanding of the development, structure, function and vascular supply of the spinal cord, brainstem and forebrain. Students will acquire an in-depth knowledge of the neural structures and connections that underpin sensory processing and perception, reflexive and voluntary motor control and the emergence of complex higher functions in the cerebral cortex such as language and emotions.

This comprehensive systems neuroscience course equips students with skills directly applicable to brain research and pre-medical training.

Course Aim

The aim of this course is to provide students with a basic understanding of the structural organisation of the human central nervous system in sufficient depth to form the basis for further clinical or research studies of the nervous system.

Student Learning Outcomes

- I. To describe the parts of the spinal cord, brainstem and forebrain and their vascular supply.
- II. To relate the neuroanatomical organisation of the central nervous system to its functions, including the processing of sensory inputs, control of motor outputs and emergence of higher brain functions.
- III. To apply structure and function knowledge of the central nervous system and its vascular supply to solve elementary neurological problems.

How the course relates to other courses

ANAT3411 is offered as component of the Anatomy major in the BSc and BMedSc, or as a year 3 elective in other BSc and BMedSc programs and in the BExPhys program. It is also a key component of the Neuroscience major in the BSc and BSc (Adv) programs. It builds on the basic knowledge of the nervous system, previously obtained in either ANAT1521, ANAT2111 or ANAT2511. It provides a useful (though not compulsory) basis for NEUR3221 Neurophysiology (offered in Term 2) and a Honours in Neuroscience (NEUR4442 and NEUR4441).

Changes since 2020

- The 3 x 1 hr lectures will be delivered online and on schedule (synchronized) and recorded in Teams. They will be delivered at the beginning of the week on Mondays and Tuesdays.
- There were 2 x 2hrs practical classes last year. The first 2 hr practical class has been changed to a 2 hrs tutorial which will be delivered online and on schedule on Wednesdays and recorded in Teams. The second 2 hrs practical class has been reduced to 1.5 hr and will be delivered face to face by demonstrators in the Anatomy labs.
- The course will be managed with Moodle and Teams.
- The lab manual has been extensively revised with a better integration of BrainStorm resources

Teaching Rationale and Strategies

The course involves 6.5 hours per week of instruction – 3 x 1hr lectures, 1 x 2hrs tutorial and 1 x 1.5 hr practical class. The lectures will be delivered at the beginning of the week on Mondays and Tuesdays followed by the tutorial on Wednesdays and the practical class on Thursday. Lecture slides and notes will be uploaded to Moodle prior to the beginning of each lecture.

The tutorials will be delivered by one of the lecturers of the course to guide the students through a series of learning activities related to the material presented in the preceding lectures. This will include online activities on Moodle, on the computer software BrainStorm, and Q&As. In practical classes, students working in small groups under the guidance of their demonstrators, will identify key structures in 3D models, prosected specimens and MRI images of the brain. BrainStorm is an internet application designed to help students consolidate their learning at any time outside of formal classes.

We encourage students to question, observe and share knowledge and experiences with their peers and teachers. We endeavour to make the material interesting to stimulate an enthusiasm for the fascinating subject matter that is covered in this course. Interaction and engagement are essential to facilitate learning.

Practical classes are compulsory. Students are also strongly encouraged to attend the online lectures live rather than just view the recordings offline. Students **must ensure** that they have **viewed and studied the material in the lectures** PRIOR to attending the tutorial and practical classes.

During Flexi week (week 6), the 2 hrs of lecture on Tuesday will be replaced by an optional online revision session and the practical class will be an optional revision open class in the Anatomy Labs from 12 to 3 pm with your demonstrators. These revisions are in preparation for Spot test 1 which will be on Monday of the following week (week 7).

TIMETABLE

Lectures

Monday (w 1-5, 8-9)	2 - 3 pm	online, synchronised
Tuesday (w 1-10)	9-11 am	online, synchronised

Tutorial

Wednesday (w 1-5, 7-10)	10am - 12 pm	online, synchronised
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Practical

Cohort 1:

Thursdays (w 1-10)	12 – 1:30 pm	Anatomy Lab D26 Level1
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Cohort 2:

Thursdays (w 1-10)	1:30 - 3 pm	Anatomy Lab D26 Level1
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ANAT3411 Neuroanatomy – Class Schedule 2021 (weeks 1-6)

Week	Date	Time	Venue	Activity
1	Mon Feb 15 Tue Feb 16 Wed Feb 17 Thu Feb 18	2-3 pm 9-11 am 10-12 pm 12-3 pm	Online Online Online Diss Rm	L1 - Neurohistology L2 - Development of the Nervous System L3 - General Organisation of the Brain T1 - Neurohistology & Development of the Nervous System P1 - Development of the Nervous System & General Organisation of the Brain
2	Mon Feb 22 Tue Feb 23 Wed Feb 24 Thu Feb 25	2-3 pm 9-11 am 10-12 pm 12-3 pm	Online Online Online Diss Rm	L4 - Spinal Cord 1 L5 - Spinal Cord 2 L6 - Spinal Cord 3 T2: Spinal Cord: Gray and White Mater P2 - Spinal Cord: Gray and White Mater
3	Mon Mar 1 Tue Mar 2 Wed Mar 3 Thu Mar 4	2-3 pm 9-11 am 10-12 pm 12-3 pm	Online Online Online Diss Rm	L7 - Medulla L8 - Pons and Midbrain L9 - Reticular formation T3 - Brainstem: Medulla, Pons & Midbrain P3 - Brainstem: Medulla, Pons & Midbrain
4	Mon Mar 8 Tue Mar 9 Wed Mar 10 Thu Mar 11	2-3 pm 9-11 am 10-12 pm 12-3 pm	Online Online Online Diss Rm	L10 - Cranial nerves part 1 L11 - Cranial nerves part 2 L12 - Cranial nerves part 3 T4 - Cranial nerves P4 - Cranial nerves
5	Mon Mar 15 Tue Mar 16 Wed Mar 17 Thu Mar 18	2-3 pm 9-11 am 10-12 pm 12-3 pm	Online Online Online Diss Rm	L13 - Auditory System L14 - Vestibular System L15 - Visual System T5 – Auditory, Vestibular & Visual Systems P5 – Auditory, Vestibular & Visual Systems
6 Flexi week	Mon Mar 22 Tue Mar 23 Wed Mar 24 Thu Mar 25	2-3 pm 9-11 am 10-12 pm 12-3 pm	Online Online Online Diss Rm	No lecture L16 – Revision (optional) L17 – Revision (optional) No tutorial P6 - Revision (optional)

ANAT3411 Neuroanatomy – Class Schedule 2021 (weeks 7-10)

Week	Date	Time	Venue	Activity
7	Mon Mar 29	2-3 pm	Online	SPOT TEST1 L18 Thalamus L19 Telencephalon T7 – Thalamus & Telencephalon P7 – Thalamus and Telencephalon
	Tue Mar 30	9-11 am	Online	
	Wed Mar 31	10-12 pm	Online	
	Thu April 1	12-3 pm	Diss Rm	
8	Mon April 5	2-3 pm	Online	L21 - Motor Cortex (<u>Easter Monday</u>) L22 - Basal Ganglia L23 - Cerebellum T8 - Basal Ganglia and Cerebellum P8 - Basal Ganglia & Cerebellar Disorders
	Tue April 6	9-11 am	Online	
	Wed April 7	10-12 pm	Online	
	Thu April 8	12-3 pm	Diss Rm	
9	Mon April 5	2-3 pm	Online	L24 - Cerebral Cortex L25 - Hypothalamus L26 - Limbic System T9 - Cerebral cortex & Limbic system P9 - Cerebral cortex & Limbic system
	Tue April 6	9-11 am	Online	
	Wed April 7	10-12 pm	Online	
	Thu April 8	12-3 pm	Diss Rm	
10	Mon April 12	2-3 pm	Online	– No lecture - L27 - Blood Supply to the Brain, Venous Drainage, Meninges & CSF T10 – Clinical cases P10 - Blood Supply to the Brain, Venous Drainage, Meninges & CSF
	Tue April 13	9-11 am	Online	
	Wed April 14	10-12 pm	Online	
	Thu April 15	12-3 pm	Diss Rm	

Please note: Lecture L21 falls on Easter Monday. This lecture will be pre-recorded and made available online.

Attendance

Students are strongly advised to keep up to date with lectures, tutorials and attend practical classes. Pre-tut/prac quizzes which contribute to 20% of the final mark will be conducted at the beginning of each tutorial and practical classes.

RESOURCES

See also [Learning Resources](#).

Online

- **BrainStorm Interactive Neuroanatomy**
 - URL: <https://brainstormneuro.net>
 - BrainStorm is now hosted by BEST. Please note that a login authentication step will be introduced at a later stage during the term. Brainstorm is free for UNSW students and staff.

Text Book

- T.W. Vanderah, and D.J. Gould. **Nolte's The Human Brain: An Introduction to its Functional Anatomy**, 7th ed. C.V. Mosby, 2016. This is a comprehensive text.

OR

- T.W. Vanderah, **Nolte's The Human Brain In Photographs And Diagrams**, 5th Ed Elsevier, 2018. This is a good companion to the comprehensive Nolte's textbook.
- Crossman, A.R. and Neary, D. **Neuroanatomy An Illustrated Colour Text**, 5th ed. Churchill Livingstone, 2015. This text is adequate but covers just the essentials.

Library References

- M.F. Bear, B.W. Connors and M.A. Paradiso. **Neuroscience – Exploring the Brain**, 4th ed., Lippincott Williams and Wilkins, 2016. (3rd Ed 2007 OK if 4th not available)
- Waxman, S, G., **Clinical Neuroanatomy**, 28th ed. McGraw Hill, 2017.
- J.A. Kiernan: Barr's The Human Nervous System. **An anatomical Viewpoint**, 8th Edition. J. B. Lippincott, 2004.
- D. E. Haines: Neuroanatomy. **An Atlas of Structures, Sections and Systems**: 8th Edition. Urban and Schwarzenberg, 2012.
- E.R. Kandel, J.H. Schwartz, T.M. Jessell, S.A. Seigelbaum, and A.J. Hudspeth. **Principles of Neural Science**, 5th ed. Elsevier, 2013
- C. Watson, M. Kirkcaldie, and G. Paxinos, **The Brain**. Elsevier, 2010

Revision Facilities

BrainStorm is available on all student computers in the Wallace Wurth Building, including those in rooms G06/07 of the Wallace Wurth building.

Models and dissections of anatomical structures are available in the Anatomy Museum (Rm G09).

ASSESSMENT

Spot Test 1 (50 min)	20%
Spot Test 2 (50 min)	20%
Pre-tut/prac quizzes (2x4 min, weekly)	20%
Theory exam (2hr)	40%

Spot Tests and theory examinations will be based on the specific objectives, learning activities and recommended readings listed for each class.

Spot Tests

These are practical examinations, based on practical class contents, that assess your ability to identify structures in brain dissections and cross-sections (including MR images) and to answer relevant short theory questions. You are expected to be able to identify structures shown **in bold type** in the practical class Lab Manual and to answer fundamental theory questions about these structures. The Spot Tests are computer based and running from Moodle. Typically, they present 15 questions and will not last more than 50 min. More information will be provided at a later stage on the conditions in which the spot test will be conducted.

Spot Test 1 will be held on Monday of Week 7 during the lecture slot (2-3 pm) and will examine material up to and including the Visual System (week 5).

Spot Test 2 and the Theory Exam will be held during the exam period (30 April-13 May 2021) and will examine material from the Thalamus (week 7) onwards. The exact time will be set by Central, later during the term.

Pre-tut/prac quizzes

The pre-tut/prac quizzes ensure students keep up with lecture material and have adequately prepared for the upcoming tutorial and practical classes. They contribute 20% towards their final assessment. The quizzes will be conducted at the beginning of the tutorials and practicals. On each day, students will have 4 minutes to answer 2 multiple choice questions under exam conditions on material from:

- i) the preceding lectures (and tutorial) of the week
- ii) the current tutorial or practical class

Students who wish to perform well in the quizzes will need to i) attend the lectures (and tutorial) of the week and ensure they can answer basic questions that may arise from the learning objectives; and ii) pre-read the content of the tutorial and practical notes before attending the tutorial and practical class, taking particular note of the class Learning Objectives. There will be a total of 18 quizzes, however, only the best 14 quizzes will be considered for the calculation of the final quiz score. Students late to the tutorial and practical class will not be allowed to sit the quiz unless they have a valid reason. Students can bring their own devices to conduct the quizzes.

Theory Examination

The theory exam will be held online during the exam period (30 April-13 May 2021). This will consist of 40 multiple choice questions (60% of the theory exam mark) and 2 written questions (40% of the theory exam mark). The exam will test understanding of the structural organization of the brain and spinal cord and its relationship to function,

according to the Learning Outcomes defined earlier. It will cover the whole course, integrating knowledge from lectures and practicals.

Failure to complete an assessment

All assessments must be attempted. Failure to sit a spot-test or theory exam without lodgement of an application for Special Consideration with Student Central will lead to automatic failure of the course. A student may be required to sit a supplementary exam or submit a written assignment in place of a missed test.

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

Supplementary Exams

Supplementary exams (if required) **will be held at the end of May (24-28 May)**. Please note that applications for Special Consideration for supplementary exams are not usually accepted, except in TRULY exceptional circumstances. For more information about special consideration please refer to <https://student.unsw.edu.au/special-consideration>

Self-directed learning

Self-directed learning stimulus questions have been included at the end of all tutorial and practical classes. You are encouraged to work through these after each class to help you evaluate your own understanding. They are designed to prompt you to revise your lectures, practical manual and relevant textbook chapters. As such, answers will not be provided for these questions, as they are intended to encourage you to perform your own self-directed learning, i.e. to actively seek the answers and discuss these with your peers in your own time. You are encouraged to use the Moodle discussion forum to debate the answers amongst yourselves. In most cases you should be able to work them out if you have attended the lectures and tutorial/practical classes.

SERVICES

Equitable learning services

If you have a disability, medical condition, learning disability, or are dealing with personal circumstances that affect your study, Equitable Learning Services may be able to provide you with assistance. If you are a student with a registered condition, please let the convenors of the course at the beginning of the course. More information is available from: <https://student.unsw.edu.au/els>

Student Support services

- Transitioning to Online Learning <https://www.covid19studyonline.unsw.edu.au/>
- Guide to Online Study <https://student.unsw.edu.au/online-study>
- UNSW Student Life Hub <https://student.unsw.edu.au/hub#main-content>

STUDENT RISK MANAGEMENT PLAN

Medicine and Science Teaching Laboratory Student Risk Assessment	 UNSW SYDNEY	Gross Anatomy Practical Classes for Medical and Science Students Bioscience Building Level 1 LAB08A/07
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Hazards	Risks	Controls
Physical Cold temperature (16°C) Sharp bone/plastic Biological Fungi, bacteria (tetanus), hepatitis B and C Chemical Formaldehyde Methylated spirits 2-phenoxyethanol	Cold Penetrating wound of foot Infection Corrosive/Flammable Flammable Irritant	<input type="checkbox"/> Wear laboratory coat over appropriate warm clothing <input type="checkbox"/> Wear enclosed shoes with full coverage of the dorsum of the foot <input type="checkbox"/> Wear protective eyewear <input type="checkbox"/> Wear face mask (if required) <input type="checkbox"/> Have appropriate immunisation <input type="checkbox"/> Do not eat, drink or smoke in the Anatomy Lab <input type="checkbox"/> Do not place anything (e.g. pens, pencils) into your mouth <input type="checkbox"/> Use disposable gloves when handling wet specimens and do not cross-contaminate models or bones with wet specimens <input type="checkbox"/> Use disinfectant and wipes for cleaning models <input type="checkbox"/> Always wash hands with liquid soap and dry thoroughly with disposable paper towel before leaving (hand sanitisers also available) <input type="checkbox"/> Low concentrations of chemicals used <input type="checkbox"/> Chemicals used in well ventilated area <input type="checkbox"/> Safety Data Sheets for chemicals available

Personal Protective Equipment required				
 <div style="background-color: blue; color: white; padding: 2px; width: 60px; margin: auto;">Lab. Coat</div>	 <div style="background-color: blue; color: white; padding: 2px; width: 60px; margin: auto;">Closed in footwear</div>	 <div style="background-color: blue; color: white; padding: 2px; width: 60px; margin: auto;">Safety Glasses</div>	 <div style="background-color: blue; color: white; padding: 2px; width: 60px; margin: auto;">Gloves</div>	 <div style="background-color: blue; color: white; padding: 2px; width: 60px; margin: auto;">Mask</div>

Emergency Procedures
 In the event of an alarm sounding, stop the practical class and wait for confirmation to evacuate from demonstrators. Then wash your hands and pack up your bags. Follow the instructions of the demonstrators (and/or fire wardens) regarding exits and assembly points.

- Clean up and waste disposal**
- Cover wet specimens with the towels provided. Make sure that towels do not hang over the edge of the table, because this allows fluid to drip onto the floor. Fluids on the floor are a major safety hazard and should be reported to staff immediately.
 - Replace stools under the tables in your cubicle (if applicable).
 - Remove your gloves and dispose in the biowaste bins provided.
 - Wash your hands and instruments thoroughly with the soap and dry your hands with paper towel.
 - Remove your laboratory coat when you leave the dissecting room.

Ethics Approval
 This type of practical has been previously considered and approved by the UNSW Human Research Ethics Advisory Panel (HC180115).

Declaration
 I have read and understand the safety requirements for this practical class, and I will observe these requirements.

Signature:..... **Date:**.....
Student number: