



Faculty of Medicine
School of Medical Sciences

ANAT3411

NEUROANATOMY

COURSE OUTLINE

TERM 1, 2020

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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 prac in the dissecting room. Keep the signed form in your prac manual and bring it to classes with you. It is not necessary to give it to your tutor or Course Convenor).

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 medalsciences.med.unsw.edu.au)

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COURSE STAFF

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COURSE INFORMATION

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

The course consists of 7 hours per week of face-to-face teaching (3 x 1 hr lectures and 2 x 2 hours practical classes).

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 and provides the background (prerequisite) for NEUR3211 Research Topics in Neuroscience (offered in Term 3). It also provides a useful (though not compulsory) basis for NEUR3221 Neurophysiology also (offered in Term 2).

Changes since 2019

- Prac classes will be delivered in the new Anatomy labs on level 1 North of the Bioscience building (D26).
- The group project has been replaced with pre-prac quizzes which will account for 20% of the final mark. The final theory exam weight has been reduced from 45% to 40% of the final mark.

Teaching Rationale and Strategies

The course involves 7 hours per week of instruction – 3 x 1-hour lectures and 2 x 2-hour practical classes. Practical classes are preceded by lectures which usually introduce the topic for the practical class. Lecture slides and notes are uploaded to Moodle prior to the beginning of each lecture.

For some lectures given by Drs Carrive and Potas, lecture notes and diagram outlines will also be uploaded, and students are encouraged to bring these to the lecture, either in hard copy or on a tablet. Students will have the opportunity to develop and label these during the lectures.

In practical/tutorial classes, students working in small groups under the guidance of their tutors will identify key structures in prosected specimens, models and on sections and MRI images of the brain using computer software (BrainStorm). Students will also participate in tutorial discussion on relevant functional and clinical aspects. BrainStorm is available to use on-line so students can prepare and consolidate their learning 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 lectures rather than just view them online. If unable to attend the lectures for some reason students MUST ensure that they view or listen to the lecture PRIOR to attending the practical classes.

TIMETABLE

Lectures

| | | |
|------------------------|--------------|---------|
| Monday (w 1-10) | 10 am -12 pm | LG03 WW |
| Wednesday (w 1-10) | 3 -4 pm | Matt D |
| Monday April 27 (w 11) | 10 am-12 pm | LG03 WW |

Tutorial/Practicals*

Cohort 1:

| | | |
|--------------------|----------|------------------------|
| Tuesdays (w 1-10) | 1 - 3 pm | Anatomy Lab D26 Level1 |
| Thursdays (w 1-10) | 1 - 3 pm | Anatomy Lab D26 Level1 |

Cohort 2:

| | | |
|--------------------|----------|------------------------|
| Tuesdays (w 1-10) | 3 - 5 pm | Anatomy Lab D26 Level1 |
| Thursdays (w 1-10) | 3 - 5 pm | Anatomy Lab D26 Level1 |

*A number of practical classes (involving computers) will also use WW Rm G06-07.

ANAT3411 Neuroanatomy – Class Schedule 2020 (weeks 1-6)

| Week | Date | Time | Venue | Activity |
|-------------|-------------------|-----------------------------|----------------|---|
| 1 | Mon Feb 17 | 10-12 pm | LG03WW | Lect: L1 - Neurohistology L2 - General Organisation of the Brain |
| | Tue Feb 18 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P1 - Gross Anatomy of the Brain & Neurohistology |
| | Wed Feb 19 | 3-4 pm | Matt D | Lect: L3 - Development of the Nervous System |
| | Thu Feb 20 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P2 - Development of the Central Nervous System |
| 2 | Mon Feb 24 | 10-12 pm | LG03WW | Lect: L4-5 - Spinal Cord 1 |
| | Tue Feb 25 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P3 - Spinal Cord 1: Gross, Nuclei & Reflexes |
| | Wed Feb 26 | 3-4 pm | Matt D | Lect: L6 - Spinal Cord 2 |
| | Thu Feb 27 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P4 - Spinal Cord 2: Tracts & Clinical Applications |
| 3 | Mon Mar 2 | 10-12 pm | LG03WW | Lect: L7 – Medulla L8 - Pons and Midbrain |
| | Tue Mar 3 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P5 – Brainstem: Medulla, Pons & Midbrain |
| | Wed Mar 4 | 3-4 pm | Matt D | Lect: L9 - Cranial nerves 1 |
| | Thu Mar 5 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P6 - Cranial nerves 1: III, IV, VI, XI, XII |
| 4 | Mon Mar 9 | 10-12 pm | LG03WW | Lect: L10-11 - Cranial nerves 2 |
| | Tue Mar 10 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P7 - Cranial nerves 2: V, VII, VIII, IX, X |
| | Wed Mar 11 | 3-4 pm | Matt D | Lect: L12 - Reticular formation |
| | Thu Mar 12 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P8 - Autonomic Nervous System |
| 5 | Mon Mar 16 | 10-12 pm | LG03WW | Lect: L13-14 - Revision |
| | Tue Mar 17 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P9 - Revision |
| | Wed Mar 18 | 3-4 pm | Matt D | Lect: <i>-no lecture</i> |
| | Thu Mar 19 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P10 - Spot test 1 |
| 6 | Mon Mar 23 | 10-12 pm | LG03WW | Lect: L15 - Auditory System L16 - Vestibular System |
| | Tue Mar 24 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P11 - Auditory & Vestibular Systems |
| | Wed Mar 25 | 3-4 pm | Matt D | Lect: L17 - Visual System |
| | Thu Mar 26 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P12 – The Retina & Visual Pathways |

ANAT3411 Neuroanatomy – Class Schedule 2020 (weeks 7-11)

| Week | Date | Time | Venue | Activity |
|-------------|---------------------|-----------------------------|----------------|---|
| 7 | Mon Mar 30 | 10-12 pm | LG03WW | Lect: L18 - Somatosensory systems L19 - Thalamus |
| | Tue Mar 31 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P13 – Diencephalon & Thalamus |
| | Wed April 1 | 3-4 pm | Matt D | Lect: L20 - Telencephalon |
| | Thu April 2 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P14 – Forebrain Topography |
| 8 | Mon April 6 | 10-12 pm | LG03WW | Lect: L21 - Motor Cortex L22 - Cerebellum |
| | Tue April 7 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P15 - Cerebellum |
| | Wed April 8 | 3-4 pm | Matt D | Lect: L23 - Basal Ganglia |
| | Thu April 9 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P16 - Basal Ganglia & Cerebellar Disorders |
| 9 | Mon April 13 | --- | --- | No lecture: Easter Monday |
| | Tue April 14 | 1-3 pm or 3-5 pm | Diss Rm | Prac: No prac |
| | Wed April 15 | 3-4 pm | Matt D | Lect: L24 - Cerebral Cortex |
| | Thu April 16 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P17 - Cerebral Cortex |
| 10 | Mon April 20 | 10-12 pm | LG03WW | Lect: L25 - Hypothalamus L26 - Limbic System |
| | Tue April 21 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P18 - Olfactory & Limbic Systems |
| | Wed April 22 | 3-4 pm | Matt D | Lect: L27 - Blood supply, Venous drainage and Meninges and CSF |
| | Thu April 23 | 1-3 pm or 3-5 pm | Diss Rm | Prac: P19 - Blood Supply to the Brain, Venous Drainage, Meninges & CSF |
| 11 | Mon April 27 | 10-12 pm | LG03WW | Lec: P20 - Clinical Cases |

Please note: As Easter Monday falls on Monday of week 9, a 2 hrs lecture is lost. Consequently, there will be no Prac on the following day but a 2 hrs lecture/tutorial has been added on the Monday of Week 11, on April 27.

RESOURCES

See also [Learning Resources](#).

Online

- **BrainStorm Interactive Neuroanatomy**
 - URL: brainstormneuro.net
 - You will be redirected to the BEST network where you will be prompted to sign in. You must sign up first using your UNSW email address, then have your account verified via email.

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.

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

ASSESSMENT

| | |
|--------------------------------|-----|
| Spot Test 1 | 20% |
| Spot Test 2 | 20% |
| Pre-prac quizzes | 20% |
| Final exam (2hr written paper) | 40% |

Spot Test and theory examinations will be based on the specific objectives, learning activities and recommended reading 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. Each Spot Test typically presents 15 questions during a computer lab session. You will be 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.

Spot Test 1 will be held in Week 5 and will examine material up to and including the Autonomic Nervous System.

Spot Test 2 will be held during the exam period (2-15 May 2019) and will examine material from the auditory and vestibular systems onwards.

Pre-prac quizzes

The pre-prac quizzes ensure students keep up with lectures material and have adequately prepared for the upcoming practical class. They contribute 20% toward their final assessment. Students will have 4 minutes to answer a total of two multiple choice questions under exam conditions on material from:

- i) the preceding lecture
- ii) the current practical class

Students who wish to perform well in the quizzes will need to i) attend the previous lecture and ensure they can answer basic questions that may arise from the lecture learning objectives; and ii) pre-read the content of the practical notes before attending the practical class, taking particular note of the Class Objectives. There will be a total of 17 quizzes, however, only the best 14 quizzes will be considered for the calculation of the final quizz score. Students arriving late to the prac 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 during the exam period (2-15 May 2020). This will consist of 30 multiple choice questions (40% of the theory exam mark) and 4 written questions (60% 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 Student Learning Outcomes defined earlier. It will cover the whole course, integrating knowledge from lectures and pracs.

Failure to complete an assessment

Failure to sit a test without lodgement of an application for Special Consideration with Student Central will lead to automatic failure of the test. A student may be required to sit a supplementary exam or a written assignment in place of a missed test.

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

Supplementary Exams

Supplementary exams (if required) for ANAT3411 2020 **will be held at the end of May (25-29 May)**. Please note that applications for Special Consideration for supplementary exams are not usually accepted except in TRULY exceptional circumstances.”

Self-directed learning

Self-directed learning stimulus questions have been included at the end of most practical classes. You are encouraged to work through these after each prac to help you gauge 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 yourself if you have attended the lectures and practical classes.

STUDENT RISK MANAGEMENT PLANS

| | | |
|------------------------------|--|---|
| Medicine Teaching Laboratory |  | Gross Anatomy Practical Classes for Medical and Science Students |
| Student Risk Assessment | | Location: D26 Level 1 LAB08A/07 <small>DOC:PHSL-SRA-S&H-01rev1.1</small> |

| 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 | <ul style="list-style-type: none"> Wear laboratory coat over appropriate warm clothing Wear enclosed shoes with full coverage of the dorsum of the foot Wear protective eyewear Have appropriate immunisation Do not eat, drink or smoke in the Anatomy Lab Do not place anything (e.g. pens, pencils) into your mouth Use disposable gloves when handling wet specimens and do not cross-contaminate models or bones with wet specimens Always wash hands with liquid soap and dry thoroughly with disposable paper towel before leaving Low concentrations of chemicals used Chemicals used in well ventilated area Safety Data Sheets for chemicals available |

Personal Protective Equipment required

| | | | |
|---|--|---|--|
|  Lab. Coat |  Closed in footwear |  Safety Glasses |  Gloves |
|---|--|---|--|

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 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.
 - 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.

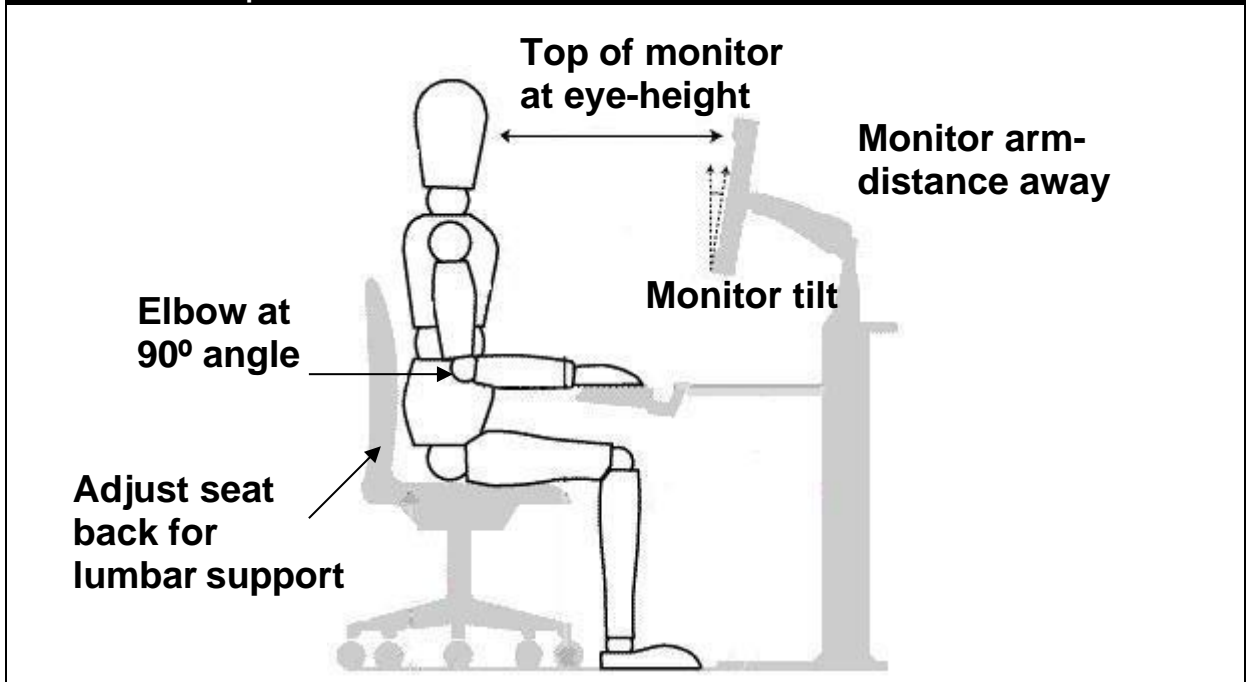
Signature:..... **Date:**.....

Student number:

ANAT-SRA-Med&SciStudent relates to RA-MED-06. Date for review: 01/02/2021

| Hazards | Risks | Controls |
|------------|-----------------------|---|
| Ergonomics | Musculoskeletal pain | <ul style="list-style-type: none"> • Correct workstation set-up • Check electrical equipment is in good condition before use • All portable electrical equipment tested and tagged |
| Electrical | Electrical shock/Fire | |

Workstation set-up



Personal Protective Equipment

Not necessary in these practicals.

Emergency Procedures

In the event of an alarm, follow the instructions of the demonstrator. The initial sound (beep) is advising you to prepare for evacuation and during this time start packing up your things. The second sound (whoop) gives instruction to leave. The Wallace Wurth assembly point is on the lawn in front of the Chancellery. In the event of an injury inform the demonstrator. First aiders and contact details are on display by the lifts. There is a wall mounted First Aid Kit located at the end of the G6 Laboratory.

Clean up and waste disposal

No apparatus or chemicals used in these practicals.

Declaration

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

Signature: Date:
Student number: