



UNSW
A U S T R A L I A

Medical Sciences
Medicine

DEPARTMENT OF ANATOMY

ANAT3411
NEUROANATOMY

COURSE OUTLINE

Semester 1, 2016
Course Outline

CRICOS Provider Code 00098G

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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 medicallsciences.med.unsw.edu.au)

COURSE STAFF

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COURSE INFORMATION

ANAT3411 Neuroanatomy is a 6UoC course.

It consists of 6 hours per week of face-to-face teaching (2 lectures and 2 x 2 hour practical classes).

Neuroanatomy is the study of the structure of the nervous system. ANAT3411 involves study of the nervous system structure at both the microscopic and gross levels as well as its development. It also introduces you to some basic research techniques used to explore brain structure. The ANAT3411 course focuses primarily on the human nervous system, although reference is made to findings in other mammals where relevant.

We try to put student learning in context, with reference to the latest developments in research and discussion of relevant clinical cases and scenarios. Students will also have the opportunity to extend their understanding of a chosen area and to develop skills in self-directed learning and critical evaluation by doing a short research project.

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:

By the end of the course students will:

- I. have gained an overview of the topography and structural organisation of the brain and spinal cord.
- II. be able to describe the basic features of development of the nervous system and to understand how and why common malformations occur in the nervous system.
- III. understand the ultrastructure of neurons and glia and the major cytoarchitectural features of the brain and spinal cord.
- IV. have gained a basic understanding of the techniques used to investigate morphology and connections of neurons to provide the basis for further research into the nervous system.
- V. have a basic understanding of the functional anatomy of sensory and motor processing and higher cerebral functions such as language and emotions and to be able to apply this knowledge to the clinical situation.
- VI. understand the principles of the blood supply and venous drainage of the nervous system and to be able to deduce the effects of rupture or occlusion of the major vessels.

See also UNSW Graduate Outcomes and attributes for Science students at <http://medalsciences.med.unsw.edu.au/students/undergraduate/advice-students#graduate>

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 Session 2). It also provides a useful (though not compulsory) basis for NEUR3221 Neurophysiology also (offered in Session 2).

Changes since 2015

- Review quizzes/adaptive tutorials are being prepared and will be made available each week through Moodle for formative assessment.
- The value of the participation component of the project mark has been reduced from 5 to 3 marks/12
- Significant changes have been made to the Development of the Nervous System practical class. Minor changes have been made to the learning activities in some other practical classes.

Teaching Rationale and Strategies

The course involves 6 hours per week of instruction - 2 lectures and 2 x 2 hour practical classes. Each practical class is preceded by a lecture, which usually introduces you to the topic for the practical class. Lecture slides and notes are uploaded to Moodle prior to each lecture.

For most lectures given by Dr Tancred, diagram outlines will also be uploaded and you are encouraged to bring these to the lecture with you, either in hard copy or on a tablet. You 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 for you to use on-line so you can prepare and consolidate your learning outside of formal classes.

We encourage you to question, observe and share knowledge and experiences with your peers and your teachers. We endeavour to make the material interesting to stimulate in you an enthusiasm for the really fascinating subject matter that is covered in this course. This is of course dependent on your interaction and engagement with the course.

Practical classes are compulsory but you are also strongly encouraged to attend the lectures rather than just viewing them online. If you are unable to attend the lectures for some reason you **MUST** ensure that you view or listen to the lecture **PRIOR** to attending the practical classes.

Timetable

Lectures

Monday	10-11 a.m.	LG03 WW
Wednesday	2-3 p.m.	LG03 WW

Tutorial/Practicals

Either	Wednesday & Friday	9-11 a.m.	Dissecting Rm (101) WW
or	Wednesday & Friday	11-1 p.m.	Dissecting Rm (101) WW

A number of practical classes (involving computers) will also use WW Rm G08.

See <http://medalsciences.med.unsw.edu.au/students/undergraduate/advice-students#Practicals> for Dissecting Room Rules.

Attendance

Students are expected to attend **at least 80% of all scheduled learning activities. Attendance at practical classes will be recorded** and students who do not attend at least 80% of practical classes may be prevented from undertaking examinations in this course. Please note that absences due to illness or misadventure will be factored into the 20% of allowable absences.

ANAT3411 Neuroanatomy – Class Schedule 2016

Week	Date	Time	Venue	Activity
1	Mon Feb 29 Wed Mar 2 Fri Mar 4	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW G08 WW LG03 WW Diss Rm	Lect: CNS Histology Prac: Neurohistology, Research Methods Lect: General Organisation of the Brain Prac: Gross Anatomy of Brain
2	Mon Mar 7 Wed Mar 9 Fri Mar 11	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm	Lect: Development of the Nervous System Prac: Development of the Nervous System Lect: Spinal Cord 1 Prac: Spinal Cord 1 – Gross, nuclei, reflexes
3	Mon Mar 14 Wed Mar 16 Fri Mar 18	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm/G08 LG03 WW Diss Rm/G08	Lect: Spinal Cord 2 Prac: Spinal Cord 2 – tracts, lesions Lect: Brainstem 1: Medulla Prac: Brainstem 1: Medulla
4	Mon Mar 21 Wed Mar 23 Fri Mar 25	10-11 am 9-11, 11-1 2-3 p.m.	LG03 WW Diss Rm/G08 LG03 WW	Lect: Brainstem 2: Pons & Midbrain Prac: Brainstem 2: Pons & Midbrain Lect: Group Project No practical class (Mid Semester break)
Break	Mar 25-Apr 3			No classes
5	Mon Apr 4 Wed Apr 6 Fri Apr 8	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm/G08 LG03 WW Diss Rm/G08	Lect: Cranial Nerves 1 Prac: Cranial Nerves 9 – 12 Lect: Cranial Nerves 2 Prac: Cranial Nerves 3 - 7
6	Mon Apr 11 Wed Apr 13 Fri Apr 15	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm/G08	Lect: Reticular Formation Prac: Autonomic Nervous System Lect: Auditory System Prac: Revision
7	Mon Apr 18 Wed Apr 20 Fri Apr 22	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm/G08	Lect: Review of Long Tracts Prac: Spot Test Lect: Cerebellum Prac: Auditory & Vestibular Systems
8	Mon Apr 25 Wed Apr 27 Fri April 29	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm/G08	No lecture (ANZAC DAY) Prac: Cerebellum Lect: Thalamus Prac: Thalamus
9	Mon May 2 Wed May 4 Fri May 6	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm/G08	Lect: Visual System Prac: Visual System Lect: Telencephalon Prac: Horizontal Slices of Forebrain
10	Mon May 9 *Mon May 9 Wed May 11 Fri May 13	10-11 am 4 p.m. 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW BSB office Diss Rm/G08 LG03 WW Diss Rm	Lect: Basal Ganglia Group Projects due Prac: Coronal Slices of Forebrain Lect: Hypothalamus Prac: Parkinson's Disease and Basal Ganglia Disorders
11	Mon May 16 Wed May 18 Fri May 20	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm/G08 LG03 WW Diss Rm	Lect: Limbic System Prac: Limbic System Lect: Cerebral Cortex Prac: Cerebral Cortex
12	Mon May 23 Wed May 25 Fri May 27	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm	Lect: Blood Supply of the Brain Prac: Blood Supply of the Brain Lect: Venous Drainage, Meninges and CSF Prac: Venous Drainage, Meninges & CSF
13	Mon May 30 Wed June 1 Fri June 3	10-11 am 9-11, 11-1 2-3 p.m. 9-11, 11-1	LG03 WW Diss Rm LG03 WW Diss Rm	Lect: Chemical Systems in the Brain Prac: Clinical Cases Lect: Neuroplasticity Prac: No class

Resources

See also [Learning Resources](#).

Online

- BrainStorm Interactive Neuroanatomy
 - URL and log in details on p. 32 (Spinal Cord 1 prac) of this manual.

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, 2015. This is a comprehensive text.

OR

- Crossman, A.R. and Neary, D. **Neuroanatomy An Illustrated Colour Text**, 5th ed. Churchill Livingstone , 2014. 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, 2015. (3rd Ed 2007 OK if 4th not available)
- Waxman, S, G., **Clinical Neuroanatomy**, 26th ed. McGraw Hill, 2010.
- J.A. Kiernan: Barr's The Human Nervous System. **An anatomical Viewpoint**, 9th Edition. J. B. Lippincott, 2008.
- D. E. Haines: Neuroanatomy. **An Atlas of Structures, Sections and Systems**: 7th Edition. Urban and Schwarzenberg, 2007.
- 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 G06/07, G08 and G16/17.

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

Assessment

Spot Test 1	20%	
Spot Test 2	20%	
Group Project (due week 10)	15 %	
Final exam (2hr written paper)		45%

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 that assess your ability to identify structures in brain dissections and cross-sections (including MR images) and to answer relevant short theory questions. In each Spot Test you will rotate around 15 stations. You will be expected to be able to identify structures **shown in bold type** in the class notes and to answer simple theory questions about these structures.

Spot Test 1 will be held in Week 7 and will examine material up to and including the Autonomic Nervous System.

Spot Test 2 will be held during the exam period and will examine material from the Auditory System onwards.

Theory Examination

This will include both multiple choice and written questions and will test understanding of the structural organization of the brain, spinal cord and cranial nerves and its relationship to function, according to the Specific Objectives defined earlier.

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 written assignment in place of a missed test.

See <http://medicalsciences.med.unsw.edu.au/students/undergraduate/advice-students#SpecialConsideration>

Supplementary Exams

It is intended that the supplementary exam (if required) for ANAT3411 in Semester 1, 2015 will be held on the **14th, 15th or 16th of July, 2015**. Please note that applications for Special Consideration for supplementary exams are not usually accepted except in TRULY exceptional circumstances.”

Formative Assessment

(i) **Adaptive tutorials or Moodle quizzes** are currently being prepared and will be made available each week through Moodle for formative assessment.

(ii) **Review questions** have been included at the end of most practical classes and you are encouraged to work through these after each prac to get some feedback on how you are going. Answers will not be provided for these questions. You should be able to work them out yourself if you have attended the prac classes. If you can't answer them refer to your lecture notes or text book.

(iii) **BrainStorm** also contains a Quiz function that enables you to test your ability to identify structures in brain dissections, cross-sections and radiological images.

Neuroanatomy Group Project

The Neuroanatomy assignment is a compulsory component of the course. It will provide an opportunity for you to develop your research and critical thinking skills by undertaking a literature review of current research on a topic of your interest.

The purpose of this assignment is to help you to develop skills in the (UNSW) graduate capabilities listed below (see p. 6 for details):

- Research, inquiry and analytical thinking abilities.
- Communication.
- Information literacy.
- Teamwork, collaboration and management skills.

In week 4, students will be allocated to groups of approximately 4 students. Groups will be able to choose from one of 4 topics. Each topic will include several defined tasks but the final product needs to be a collaboration between groups members. Each group will be expected to submit a written report of no longer than 2,500 words in length.

This project is a **compulsory** requirement of the course and is worth 15% of your final mark for this course. Of this 12% will come from the written report and all students in each group will receive the same mark. The other 3% will be determined by members of the group, each of whom will provide a collective score for each team member. Information on the group project, topics and guidance on peer assessment will be provided in a lecture in Week 5.

Your assignment should be **no longer than 2500 words in length** and you are encouraged to use diagrams where appropriate. References should be cited in the body of the assignment.

Due Date:

This report should be handed in to **Rm G27 in the BioSciences Bldg by 4.00 p.m. on Monday May 9 (beginning of Week 10)**. Marks will be deducted for reports that are handed in after this time, unless [Special Consideration](#) is granted.

Project Topics for 2016:

These will be distributed after the commencement of the course.

Criteria for Assessment of the Group Project

Scientific Content:

- Identifies the major concepts related to the assignment topic
- Demonstrates an understanding of the assignment topic
- Uses peer-reviewed research articles to support stated facts and arguments.

Effective Communication:

- Clarity (clear, simple, grammatical language, terms explained)
- Logical structure, use of headings and paragraphs
- Appropriate language length, style and format for the intended audience
- Appropriate use of media (illustrations, graphs etc)

Self-Directed Learning and Critical Evaluation:

- Sources (range, citation standards, quality, relevance)
- Critical thinking (evidence of awareness of bias in sources, others viewpoints, own views, logical argument)

Peer Assessment

- Attendance at group meetings
- Participation in planning of the report
- Contribution to group discussion
- Quality of contribution to the report
- Execution of allocated tasks effectively and on time

Guidelines for referencing in the Neuroanatomy Group Project

Any ideas which are not your own should be cited in the text as per the **APA Style** guidelines as follows:

- References by a single author should be cited as Author (date of publication), eg. Carrive (1996) or if there are two publications listed for the same author in the same year add a or b after the date eg. Carrive (1996a), Carrive (1996b).
- If the reference has two authors it should be cited as Author A and Author B (date) eg. Carrive and Tancred (1998).
- If there are more than two authors it should be cited as Author A et al (date) eg. Carrive et al (1999).

Details of APA referencing guidelines can be found at:

<http://web.med.unsw.edu.au/infoskills/apa/apa.html>

Student Risk Assessment

Medicine Teaching Laboratory



UNSW
THE UNIVERSITY OF NEW SOUTH WALES

Gross Anatomy Practical Classes for Medical and Science Students
DOC:PHSL-SRA-S&H-01rev1.1

Student Risk Assessment

Hazards	Risks	Controls
Physical Cold temperature (16°C) Sharp bone/plastic	Cold Penetrating wound of foot	<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 Have appropriate immunisation Do not eat, drink or smoke in the Dissecting Room Do not place anything (e.g. pens, pencils) into your mouth
Biological Fungi, bacteria (tetanus), hepatitis B and C	Infection	<ul style="list-style-type: none"> 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
Chemical Formaldehyde Methanol 2-phenoxyethanol	Corrosive/Flammable Irritant/toxic Irritant	<ul style="list-style-type: none"> Low concentrations of chemicals used Chemicals used in well ventilated area Safety Data Sheets for chemicals available in the laboratory

Personal Protective Equipment required

 Closed in Footwear	 Lab. Coat	 Gloves	
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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 provided and dry your hands with the 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 (HREC09372).

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: 1/2/2016