



Faculty of Medicine  
School of Medical Sciences

# ANAT341

## NEUROANATOMY

COURSE OUTLINE

SEMESTER 1, 2018

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

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## **COURSE STAFF**

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## **COURSE INFORMATION**

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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. 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.
- III. 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://medicalsciences.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 2017**

- Review quizzes/adaptive tutorials are being developed and will be made available through Moodle for formative assessment.

## 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 Drs Carrive and Potas, 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

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### Lectures

Monday	2-3 p.m.	LG03 WW
Wednesday	4-5 p.m.	LG03 WW

### Tutorial/Practicals

#### Cohort 1 (3 groups):

Wednesday & Thursday	9-11 a.m.	Dissecting Rm (101) WW
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#### Cohort 2 (3 groups):

Wednesday & Thursday	11-1 p.m.	Dissecting Rm (101) WW
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A number of practical classes (involving computers) will also use WW Rm G08.

See <http://medicallsciences.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 2018 (weeks 1-6)**

<b>Week</b>	<b>Date</b>	<b>Time</b>	<b>Venue</b>	<b>Activity</b>
1	Mon Feb 26 <b>Wed Feb 28</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: CNS Histology <b>Prac: Neurohistology, Research Methods</b>
	Wed Feb 28 <b>Thu Mar 1</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Development of the Nervous System <b>Prac: Development of the Nervous System</b>
2	Mon Mar 5 <b>Wed Mar 7</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: General Organisation of the Brain <b>Prac: Gross Anatomy of the Brain</b>
	Wed Mar 7 <b>Thu Mar 8</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Spinal Cord 1 <b>Prac: Spinal Cord 1 – Gross, nuclei</b>
3	Mon Mar 12 <b>Wed Mar 14</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Spinal Cord 2 <b>Prac: Spinal Cord 2 – tracts, lesions</b>
	Wed Mar 14 <b>Thu Mar 15</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Brainstem 1: Medulla <b>Prac: Brainstem 1: Medulla</b>
4	Mon Mar 19 <b>Wed Mar 21</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Brainstem 2: Pons & Midbrain <b>Prac: Brainstem 2: Pons &amp; Midbrain</b>
	Wed Mar 21 <b>Thu Mar 22</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Cranial Nerves 1 <b>Prac: Cranial Nerves 1</b>
5	Mon Mar 26 <b>Wed Mar 28</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Cranial Nerves 2 <b>Prac: Cranial Nerves 2</b>
	Wed Mar 28 <b>Thu Mar 29</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Reticular Formation <b>Prac: Autonomic Nervous System</b>
Break	Apr 2-Apr 6			No classes
6	Mon Apr 9 <b>Wed Apr 11</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Review of Long Tracts <b>Prac: Revision</b>
	Wed Apr 11 <b>Thu Apr 12</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Group projects <b>Prac: Spot Test</b>

**ANAT3411 Neuroanatomy – Class Schedule 2018 (weeks 7-13)**

<b>Week</b>	<b>Date</b>	<b>Time</b>	<b>Venue</b>	<b>Activity</b>
7	Mon Apr 16 <b>Wed Apr 18</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Somatosensory Systems <b>----- no prac</b>
	Wed Apr 18 <b>Thu Apr 19</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Auditory System <b>Prac: Auditory &amp; Vestibular Systems</b>
8	Mon Apr 23 <b>Wed Apr 25</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Visual System <b>----- no prac public holiday</b>
	Wed Apr 25 <b>Thu Apr 26</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: ----- no lecture public holiday <b>Prac: Visual System</b>
9	Mon Apr 30 <b>Wed May 2</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Thalamus <b>Prac: Diencephalon</b>
	Wed May 2 <b>Thu May 3</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Telencephalon <b>Prac: Horizontal Slices of Forebrain</b>
10	Mon May 7 <b>Wed May 9</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Cerebral Cortex: Motor <b>Prac: Coronal Slices of Forebrain</b>
	Wed May 9 <b>Thu May 10</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Cerebellum <b>Prac: Cerebellum</b>
11	Mon May 14 <b>Wed May 16</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Basal Ganglia <b>Prac: Basal Ganglia/Cerebellar Disorders</b>
	Wed May 16 <b>Thu May 17</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Hypothalamus <b>----- no prac --finalise projects</b>
12	Mon May 21 Mon May 21 <b>Wed May 23</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	<b><u>Group Projects due at 2 pm LG03WW</u></b> Lect: Limbic System <b>Prac: Limbic System</b>
	Wed May 23 <b>Thu May 24</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Cerebral cortex- Higher Functions <b>Prac: Cerebral cortex</b>
13	Mon May 28 <b>Wed May 30</b>	2-3 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Brain vascular Supply, Meninges, CSF <b>Prac: Blood Supply and drainage and CSF</b>
	Wed May 30 <b>Thu May 31</b>	4-5 pm <b>9-11am or 11-1 pm</b>	LG03WW <b>Diss Rm</b>	Lect: Chemical Systems in the Brain <b>Prac: Clinical Cases</b>



## RESOURCES

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See also [Learning Resources](#).

### Online

- **BrainStorm Interactive Neuroanatomy**
  - URL: [brainstormneuro.net](http://brainstormneuro.net)
  - You will be redirected to the BEST network where you will sign in using your z number and z pass. You must sign up first.

### Text Book

- T.W. Vanderah, and D.J. Gould. **Nolte's The Human Brain: An Introduction to its Functional Anatomy**, 7<sup>th</sup> ed. C.V. Mosby, 2015. This is a comprehensive text.

OR

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

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Spot Test 1	20%
Spot Test 2	20%
Group Project (due week 12)	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, 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. In each Spot Test you will be presented 15 questions during a computer lab session. 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 6 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 Somatosensory 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://medicallsciences.med.unsw.edu.au/students/undergraduate/advice-students#Special Consideration>

### Supplementary Exams

It is intended that the supplementary exam (if required) for ANAT3411 2018 **will be held at the end of July 2018** during the first week of Semester 2. 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 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.

## NEUROANATOMY GROUP PROJECT

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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 6.

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 **on Monday May 21 (beginning of Week 12) at 2 pm in LG03WW, at the beginning of the lecture**. Marks will be deducted for reports that are handed in after this time, unless [Special Consideration](#) is granted.

### Project Topics for 2018:

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

Details of APA referencing guidelines can be found at:

<https://student.unsw.edu.au/apa>

# STUDENT RISK ASSESSMENT

Medicine Teaching  
Laboratory  
Student Risk Assessment



Gross Anatomy Practical  
Classes for Medical and  
Science Students

DOC-PH51-SRA-S&H-01rev1.1

Hazards	Risks	Controls
<b>Physical</b> Cold temperature (16°C) Sharp bone/plastic  <b>Biological</b> Fungi, bacteria (tetanus), hepatitis B and C  <b>Chemical</b> Formaldehyde Methanol 2-phenoxyethanol	Cold Penetrating wound of foot  Infection  Corrosive/Flammable Irritant/toxic Irritant	<ul style="list-style-type: none"> <li>Wear laboratory coat over appropriate warm clothing</li> <li>Wear fully enclosed shoes with full coverage of the dorsum of the foot</li> <li>Have appropriate immunisation</li> <li>Do not eat, drink or smoke in the Gross Anatomy Lab</li> <li>Do not place anything (e.g. pens, pencils) into your mouth</li> <li>Use disposable gloves when handling wet specimens and do not cross-contaminate models or bones with wet specimens</li> <li>Always wash hands with liquid soap and dry thoroughly with disposable paper towel before leaving to lab</li> <li>Low concentrations of chemicals used</li> <li>Chemicals used in well ventilated area</li> <li>Safety Data Sheets for chemicals available in the laboratory</li> </ul>

### 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 the demonstrators. Then wash your hands.  
Follow the instructions of the demonstrators regarding exits and assembly points.

### Clean up and waste disposal

- Place all specimens in their original trays. 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
- 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: .....