HLTH214

Neuroanatomy

S2 Day 2019

Dept of Chiropractic

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General Information

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Credit points
3

Prerequisites
HLTH108

Corequisites

Co-badged status

Unit description
This unit builds on the basic anatomy taught in HLTH108. It focuses on the structure and function of the nervous system. The unit utilises an integrated approach within which relevant gross anatomy, histology and embryology, as well as clinical and applied anatomy are incorporated.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
2. Relate your structural knowledge of the CNS to its embryological development
3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision
4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research
5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal radiographs, MRI and CT scans.
6. Show an appreciation and respect for those who have bequeathed their bodies to research

General Assessment Information

Examinations

The University Examination period in for Semester 2 is from the 11 – 29 November, 2019. You

are expected to present yourself for examination at the time and place designated in the University examination timetable. The timetable will be available in draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations: http://www.timetables.mq.edu.au/exam

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for special consideration. The University's Special Consideration Policy can be found at https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration. Information can also be found at https://students.mq.edu.au/study/my-study-program/special-consideration

Students with a pre-existing disability/health condition or prolonged adverse circumstances may be eligible for ongoing assistance and support. Such support is governed by other policies and may be sought and coordinated through Campus Wellbeing and Support Services.

If a supplementary examination is granted as a result of special consideration, the examination will be scheduled after the conclusion of the official examination period.

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in iLearn (bit.ly/FSESupp) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. You are expected to ensure that you are available until the end of the teaching semester that is the final day of the official examination period.

Returning Assessment Tasks

1. Quizzes and Mid-semester test: Your papers will be returned during the tutorial, and the tutor will review the answers. The papers must be returned to the tutor at the end of the session.

2. Practical exam: Papers will not be returned but marks will be given out prior to the final theory exam.

3. Examination: Papers will not be returned. Marks will be made available on iLearn.

Extensions and penalties

Extensions to assignments are at the discretion of the unit convenor. It is the responsibility of the

student to prove to the convenor that there has been unavoidable disruption. Marks will be deducted for late submissions in the absence of an approved extension.

Grades

Achievement of grades will be based on the following criteria:

High Distinction: provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

Distinction: provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

Credit: provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.

Pass: provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; and communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

Fail: does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

Sometimes it helps to ‘translate’ these descriptions into numbers. So, what we expect from you in this unit, in order for you to attain a specific grade, is outlined below:

Grade	
Pass	50 – 64%
Credit	65 - 74%
Distinction	75 - 84%
High Distinction	85 - 100%

Assessment Tasks

Name	Weighting	Hurdle	Due
Nine Tutorial Quizzes	20%	No	tutorial time
Practical exam	20%	No	Week 13
Final theory exam	40%	No	TBA
Assignment Presentation	20%	No	Week 6

Nine Tutorial Quizzes

Due: **tutorial time**
Weighting: **20%**

Nine (9) Tutorial quizzes: 10 minute quizzes held at the start of tutorials in WEEKS 3, 4, 5, 6, 7, 9, 10, 11, 12 that will test **lecture** material of the previous week/s. See the schedule above for details.

The format will be multiple choice questions or fill in the missing word/s. The resultant mark will be an **AVERAGE of the 9 quiz marks (please note, NOT best x of 9)**. Absence from the tutorial without a special consideration will result in a zero mark.

On successful completion you will be able to:

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 2. Relate your structural knowledge of the CNS to its embryological development
- 3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision
- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research

Practical exam

Due: **Week 13**
Weighting: **20%**

Practical test: All identification activities conducted during the practical classes, and tutorial work are examinable, and include identifying structures on images, bones, models, prosections, radiographs, MRI and CT images.

On successful completion you will be able to:

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal radiographs, MRI and CT scans.
- 6. Show an appreciation and respect for those who have bequeathed their bodies to research

Final theory exam

Due: **TBA**
Weighting: **40%**

Final examination: This will cover the content of the entire semester. It tests knowledge of the theory, and the ability to connect that knowledge to real life situations (e.g. case studies). It will consist of a 2 hour written exam with multiple choice questions and short answer questions.

On successful completion you will be able to:

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 2. Relate your structural knowledge of the CNS to its embryological development

- 3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision
- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research

Assignment Presentation

Due: **Week 6**
Weighting: **20%**

Assignment Presentation: during week 6, the 2h practical will be given up entirely to presentations. These will be given by student groups of 5-6 members (only). Every member of the group **must have the same** practical timeslot in order that the group can be present together during their presentation.

Groups **must be chosen by the end of week 2**, and the group must submit their names, and their topic, to the convenor via email. No more than two groups can do the same topic, and so the topics will be reviewed on a first come, first served, basis. You must not begin your preparations for your presentation until the convenor has agreed that you may proceed. This is also a help to you, as you may not have chosen an appropriate topic, and therefore, regrettably, it will be declined. You will be directed to finding another topic if it is already taken or is not suitable.

Each member of the group must have a designated role and set of responsibilities, and this must be listed at the end of the presentation. All members must present. Individual marks will be given, so it is essential that each person's contribution to the work is documented.

The subject of the presentation is a science/medical media alert that relates to neuroanatomy, or a pathology/disease associated with the nervous system. It **must be recent** i.e. 2017 – 2018.

Examples of places to explore are the following:

https://www.technologynetworks.com/tn/lists/the-week-in-neuroscience-july-26-2018-306809

https://www.sciencealert.com/

http://www.dana.org/cerebrum/archives/

https://www.technologynetworks.com/

The following questions must be answered:

1. What is the latest finding? Explain what has been discovered
2. What is the relevant neuroanatomy associated with this finding? Discuss and explain the anatomy
3. What are the implications of this finding for neuroanatomy/neuropathology?

- It is essential that the article chosen comes from a reputable site. If possible, find the original paper that was published in a journal (the media article usually gives the reference)
- The presentation must be 10 minutes long with a powerpoint presentation
- There will be 5 minutes for questions

On successful completion you will be able to:

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research
- 5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal radiographs, MRI and CT scans.

Delivery and Resources

DELIVERY AND RESOURCES

Delivery mode

This unit is characterised by a moderate degree of flexibility. It incorporates a variety of learning tools and media. It will comprise:

1. 1 × 2h lecture and 1 × 1 hour lecture per week, weeks 1 - 13:
2. 1 × 2 hour laboratory practical class per week, weeks 2 - 13: Students must register for a

practical slot on e-student

3. 1 × 1 hour tutorial class per week, weeks 2 - 13: Students must register for a tutorial slot on e-student
4. 2 – 3 hours per week revision, completing the weekly Revision tasks in the laboratory manual, preparing for the laboratory practical and tutorial, self-instructional learning and readings from the text.

Class times and locations

1. Lecture*:* Monday 12-2pm in 17WW T1, and Friday 12-1pm in 17WW T1 Practicals: Monday 8-10am, 10-12am, 2-4pm, 4-6pm, 6-8pm in building F10A Anatomy Lab
2. Tutorials: Thursday 11-12am (6 Eastern road, 314), 12-1pm (6 Eastern road, 314), 1-2pm (6 Eastern road, 314), 3-4pm (11WW,160) and 4-5pm (6 Eastern road, 314)

Attendance Requirements

You must attend the practical and tutorial class in which you enrolled. Students must not exchange their class time. If you miss your assigned practical or tutorial in any week, you may request attendance at an alternative session, through email request and appropriate documentation to the unit convenor. This allowance may be used on a maximum of 2 occasions. **Attendance is taken at each practical and tutorial. If you miss more than 2 sessions without emailing the unit convenor to explain why, you will be asked to come in to discuss your progress.**

Unit Web Page

You can log in to iLearn System through **http://learn.mq.edu.au**

All lectures materials will be posted on iLearn. The Audiovisual recording will be available on ECHO on iLearn.

Required and recommended resources

Required:

- Haines, DE (2015) *Neuroanatomy, An Atlas of Stuctures, Sections, and Systems*. 9th ed. Wolters Kluwer/Lippincott Williams & Wilkins
- Krebs C, Weinberg J and Akesson E (2012) Lippincott's Illustrated Reviews Neuroscience Harvey RA (series editor) Wolters Kluwer LWW

- HLTH214 *Laboratory Course Manual* – available at Co-op bookshop. Macquarie University Printery.

Recommended:

- Kiernan, JA (2009) *Barr's The Human Nervous System An Anatomical Viewpoint*. 9th ed. Wolters Kluwer/Lippincott Williams & Wilkins, PA
- Blumenfeld H (2002) *Neuroanatomy through Clinical Cases*. Sinauer Associates Inc, Massachusetts.

Websites:

An excellent website for anatomy is now available on our Macquarie University library website. Go to Databases, choose the subject 'Chiropractic' and click on 'Anatomy.tv' for **Wolterskluwer Ovid Primal Pictures Interactive Anatomy**

4. UNIT SCHEDULE

The content is divided into 14 topics. Some topics include a few selected associated pathologies for discussion

Topic 1: Overview

- The overall organisation of the nervous system (central and peripheral), overall anatomical structure, histology and nomenclature

Topic 2: Spinal cord

- The detailed gross anatomy and cross-sectional structure of the spinal cord, with an emphasis on the fibre tracts
- Blood supply of spinal cord

Topic 3: Ontogeny

- Overview of the embryological development of the CNS

Topic 4: Cerebral cortex and cerebrum

- The detailed anatomical structure (surface, sagittal and coronal), and associated function

of the cortex, including selected Brodmann areas
- Arterial and venous blood supply of the brain

Topic 5: Limbic System

- Limbic system structure and function

Topic 6: Diencephalon

- The detailed divisions and structures, boundaries, and functions, with emphasis on the thalamus as the gateway of the cerebral cortex and the multiple functions of the hypothalamus

Topic 7: Basal ganglia

- Classification, detailed structure, position and role in modifying motor control

Topic 8: Brainstem

- The divisions, detailed anatomy and function of the brainstem as a conduit, centre of most cranial nerve nuclei, and integrator of information
- The reticular formation
- Cranial nerves

Topic 9: Special sensory pathways

- Identification of the neurological pathways of the special senses viz vision, hearing, balance, olfaction and taste

Topic 10: Cerebellum

- Detailed gross anatomy, general microanatomy, multiple inputs and functional circuitry

Topic 11: Peripheral nervous system: plexuses and peripheral nerves

- The structure of plexuses, emerging peripheral nerves and their sensory and motor functions
- The stretch reflex

- Differentiation of upper motor and lower motor neuron lesions

Topic 12: Autonomic nervous system

- Classification, gross architecture, anatomy and function of the sensory afferent and motor efferent (sympathetic and parasympathetic divisions) of the autonomic nervous system

Topic 13: Somatosensory pathways

- Trace ascending pathways from receptors to final central destination

Topic 14: Motor pathways

- Trace pyramidal and extrapyramidal descending pathways, and the role of the basal ganglia and cerebellum in the planning and monitoring of movements

Unit Schedule

Timetable for Lectures, Practicals and Tutorials

Date	Monday (2h) & Friday (1 h): LECTURES	Monday: PRACTICALS (2 hours)	Thursday: TUTORIALS (1 hour)
Week 1 Monday, July 29	Monday: Overview of nervous system Friday: Spinal cord overview	None	None
Week 2 Monday, August 5	Monday: Cerebral cortex and blood supply Friday: Ontogeny	Overview of the nervous system including overview of spinal cord	1. Group work on Organisation of the Nervous System 2. Case study on spinal cord
Week 3 Monday, August 12	Monday: Diencephalon and Internal Capsule Friday: Limbic system	Cerebral cortex and blood supply, ontogeny	1. Quiz on week 1 + 2 lectures 2. Cerebral Cortex Activity and Case Study 3. Ontogeny Activity
Week 4 Monday, August 19	Basal ganglia	Diencephalon, Internal Capsule and limbic system	1. Quiz on week 3 lectures 2. Feedback previous quiz 3. Case study on Thalamus

Week 5 Monday, August 26	Brainstem	Basal ganglia	1. Quiz on week 4 lectures 2. Feedback on previous quiz 3. Group work and case study on basal ganglia
Week 6 Monday, September 2	Cranial Nerves	Presentations	1. Quiz on week 5 lectures 2. Feedback on previous quiz 3. Brainstem discussion and case study
Week 7 Monday, September 9	Special senses	Brainstem and Cranial Nerves	1. Quiz on week 6 lectures 2. Feedback on previous quiz 3. Discussion and case study on cranial nerves
September 16 – 29	MIDSEMESTER BREAK		
Week 8 Monday, September 30	Cerebellum	Special Senses	1. Feedback on previous quiz 2. Radiology
Week 9 Tuesday, October 8	Friday: plexuses and peripheral nerves	Labour Day	1. Quiz on weeks 7 + 8 lectures 2. Case studies on special senses and cerebellum
Week 10 Monday, October 14	ANS	Cerebellum	1. Quiz on week 9 lectures 2. Feedback on previous quiz 3. Group work and case study on peripheral nerves
Week 11 Monday, October 21	Sensory afferent pathways	ANS	1. Quiz on week 10 lectures 2. Feedback on previous quiz 3. Case studies on ANS
Week 12 Monday, October 28	Motor efferent pathways	Revision	1. Quiz on week 11 lectures 2. Feedback on previous quiz 3. Sensory afferent pathways activities
Week 13 Monday, Nov 4	None	PRACTICAL EXAM	1. Feedback on previous quiz 2. Activity and case study on motor pathways

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Undergraduate students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- 2. Relate your structural knowledge of the CNS to its embryological development
- 3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision
- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research

Assessment tasks

- Final theory exam

- Assignment Presentation

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research
- 5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal radiographs, MRI and CT scans.
- 6. Show an appreciation and respect for those who have bequeathed their bodies to research

Assessment tasks

- Nine Tutorial Quizzes
- Practical exam
- Final theory exam

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
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Assessment tasks

- Nine Tutorial Quizzes
- Practical exam
- Final theory exam
- Assignment Presentation

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 2. Relate your structural knowledge of the CNS to its embryological development
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Assessment tasks

- Nine Tutorial Quizzes
- Practical exam
- Final theory exam
- Assignment Presentation

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and

peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.

- 2. Relate your structural knowledge of the CNS to its embryological development
- 3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision
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Assessment tasks

- Nine Tutorial Quizzes
- Practical exam
- Final theory exam
- Assignment Presentation

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- 2. Relate your structural knowledge of the CNS to its embryological development
- 3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision

- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research

Assessment tasks

- Final theory exam
- Assignment Presentation

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- 1. Describe in detail the organisation, structure and function of the cerebral cortex, brainstem, diencephalon, cerebellum, basal ganglia, limbic system, spinal cord, and peripheral nerves. This includes the meninges, ventricular system, blood supply and main histological features of the tissues.
- 3. Trace somatic and autonomic: sensory inputs in detail from receptor to cortex, via brainstem and thalamus; and motor outputs from motor cortex to effector organ, including the additional inputs from the basal ganglia, cerebellum and frontal cortex. This includes a detailed knowledge of the specific ascending and descending pathways, and the pathways for taste, smell, hearing, balance, and vision
- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research
- 5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal radiographs, MRI and CT scans.

Assessment tasks

- Nine Tutorial Quizzes
- Final theory exam
- Assignment Presentation

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- 4. Extend your acquired knowledge of neuroanatomy to discuss, evaluate and interpret clinical case studies and published research
- 5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal radiographs, MRI and CT scans.
- 6. Show an appreciation and respect for those who have bequeathed their bodies to research

Assessment tasks

- Practical exam
- Final theory exam

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- 5. Participate in practical sessions in which the knowledge acquired in texts and lectures is applied in a group situation. You should be able to reason, question and communicate your understandings to each other and your tutors as you complete tasks set in the practicals. Develop a competency in analysing, interpreting and assessing relevant anatomical structures on images, photographs, bones, models, prosections, normal

radiographs, MRI and CT scans.

- 6. Show an appreciation and respect for those who have bequeathed their bodies to research

Assessment tasks

- Practical exam
- Final theory exam

Changes from Previous Offering

The order of the content has been re-arranged for better flow, based on feedback from students and tutors. The tutorials have been revised to include clinical cases that have been reduced from the lecture content. The emphasis of the tutorials has shifted from Team Based Learning to revision and application of knowledge. The number of weekly quizzes in the tutorials has increased to replace the mid-semester test, as this was considered a better way to support ongoing study.