Description of Neuronatomy course

Faculty of Medicine	Department of Anatomy
Course Name: Neuroanatomy	
First semester (16 weeks)	**Third year**
3 theoretical hours weekly	**2 practical hours weekly**

Neuroanatomy

General Aims

The course aims to provide knowledge and skills related to the descriptive and clinical anatomy of the central nervous system.

Course Objectives

After completing the theoretical part of course, students should be able to:

1) Describe the ascending and descending tracts in the brain and spinal cord, determining their position and function, and anticipating the consequences of their injury
2) Describe the brain stem and cerebellum, determine its structure, parts, and connections, describe the autonomic nervous system, and identify its components
3) Describe the surfaces of the brain, describe the basal nuclei of the brain and white matter, and determine their connections and function
4) Describe the diencephalon and its divisions and identify its connections.
5) Description of the limbic system, its connections, and its function
6) Identification of cranial and spinal nerves and their nuclei in the brainstem, their pathway and function and prediction of the consequences of their injury
7) Describe the arterial perfusion and venous return of the brain, brainstem and spinal cord, and know the sequelae of arterial occlusions
8) Describe the meninges, ventricular system and cerebrospinal fluid and determine their clinical significance

After completing the practical part of course, students should be able to:

1. Recognize and draw the outer faces, sulci, gyri, of the brain
2. Distinguishing and locating cranial nerves on the brainstem and at the cranial base
3. Determination on the external appearance of the cerebellum and brainstem
4. Distinguishing the arterial perfusion and venous return of the brain both visually and on radiologic images and distinguishing the venous sinuses on the meninges
5. Visually identifying the main elements on the brain sections at different levels, and on drawings and radiographs, and drawing them
6. Draw the brainstem and identify the anatomical structures in each section
7. Distinguishing the sections of the spinal cord and drawing a detailed section of the spinal cord

Activities description:

Acquisition activities (AA): Learning through acquisition is what learners are doing when they are listening to a lecture or podcast, reading from books or websites, and watching demos or videos.

Collaboration activities (CA): Learning through collaboration embraces mainly discussion, practice, and production. Building on investigations and acquisition it is about taking part in the process of knowledge building itself.

Discussion activities (DA): Learning through discussion requires the learner to articulate their ideas and questions, and to challenge and respond to the ideas and questions from the teacher, and/or from their peers.

Investigation activities (IA): Learning through investigation guides the learner to explore, compare and critique the texts, documents and resources that reflect the concepts and ideas being taught.

Practice activities (PraA): Learning through practice enables the learner to adapt their actions to the task goal, and use the feedback to improve their next action. Feedback may come from self- reflection, from peers, from the teacher, or from the activity itself, if it shows them how to improve the result of their action in relation to the goal.

Production activities (ProA): Learning through production is the way the teacher motivates the learner to consolidate what they have learned by

Topics:

1. Introduction to the nervous system
2. The general external appearance of the central nervous system
3. Spinal cord (external and internal appearance, ascending and descending tracts)
4. Brainstem (appearance, functional components, tracts, and sections of the brainstem)
5. The pathways inside the brain
6. Cranial nerves
7. Diencephalon (anatomical components, thalamic and hypothalamic nodules, their connections and function)
8. Basal nuclei (anatomical components direct and indirect pathways and associated diseases)
9 .Cerebellum (external form, internal structure, communication and function)
10. The limbic system (anatomical components of the hippocampal formation and circuit)
11. Cerebral cortex (functional areas and their injuries).
12. The vascular system of the brain, meninges and ventricles
13. Injuries to the nervous system (cerebral ischemia, brain stem and spinal cord injuries)
14. Autonomic system (sympathetic, parasympathetic and enteric)

Week	Topic (BR: Book reding, RV: Recorded Video; PCSA: Pre-class student activity; DCSA: During class student activity, HW: Homework)	
1	1. Introduction to the nervous system (histologicy and embryology)	RV: watching recorder video on digital tablet explication https://youtu.be/8brXG9lqs1Q (AA, 1 hour) BR: reading chapter 1 from the neuroanatomy book (pages 18-28) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 1 hour) PCSA: search on internet about nervous system development. (IA, 1 hours) DCSA: discussing the internet research done by students and compared with RV. (DA, 1 hours) HW: drawing a schematic form which demonstrate the embryological development of nervous system (PraA, 1 hours)
2	The general external appearance of the central nervous system	RV: watching recorder video on digital tablet explication https://youtu.be/lhMN_cLF_p0 (AA, 2 hour) BR: reading chapter 2 from the neuroanatomy book (pages 36-64) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hours) PCSA: search on internet about general appearance of central nervous system. (IA, 1 hour) DCSA: discussing the internet research done by students. (DA, 1 hour, ProA 1 hour) HW: drawing a schematic form which demonstrate the embryological development of nervous system (PraA, 1 hours)
3	The spinal cord (cord)	RV: watching recorder video on digital tablet explication https://youtu.be/hePg6oU63p0 https://youtu.be/Nfcz9TEJX5g (AA, 2 hours) BR: reading chapter 3 from the neuroanatomy book (pages 66-98) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hours) PCSA: search on internet about spinal cord lesions. (IA, 1 hour)

		DCSA: discussing the internet research done by students and explain the principal of lesions. (DA, 1 hour, ProA 1 hour) HW: drawing a transverse section in the spinal cord with descending and ascending tracts (PraA, 2 hours)
4	Brainstem	RV: watching recorder video on digital tablet explication https://youtu.be/f8tIVS8NYgM https://youtu.be/EDjXQbMenmE (AA, 3 hour) BR: reading chapter 4 from the neuroanatomy book (pages 105-140) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 3 hour) PCSA: search on internet about brainstem lesions. (IA, 2 hours) DCSA: discussing the internet research done by students and explain the principal of lesions. (DA, 2 hours) HW: drawing a 7 transverse sections in the brain steam (PraA, 2 hours)
5	Cranial nerves	RV: watching recorder video on digital tablet explication https://youtu.be/ClNope7K2eI https://youtu.be/ZYZFQ9AsjNI (AA, 3 hour) BR: reading chapter 5 from the neuroanatomy book (pages 161-225) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 3 hour) PCSA: search on internet about cranial nerves lesions. (IA, 2 hours) DCSA: discussing the internet research done by students and explain the principal of lesions. (DA, 2 hours) HW: drawing a trigeminal nerve diagram (PraA, 1 hours)
6	The ways inside the brain	RV: watching recorder video on digital tablet explication https://youtu.be/hkARFpZWvHI https://youtu.be/HFekkax-oZo (AA, 2 hour) BR: reading chapter 6 from the neuroanatomy book (pages 229-247) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour)

Textbooks & References

		PCSA: search on internet about visual lesions and nystagmus. (IA, 1 hours) DCSA: discussing the internet research done by students and explain the principal of lesions. (DA, 1 hours) HW: drawing a the optic chiasm and stations of accommodation reflex(PraA, 1 hours)
7	Diencephalon	RV: watching recorder video on digital tablet explication https://youtu.be/oYonFTlRrrE https://youtu.be/02GKOTWcqqA (AA, 2 hour) BR: reading chapter 7 from the neuroanatomy book (pages 276-287) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour) PCSA: search on internet about thalamus and hypothalamus functions. (IA, 1hours) DCSA: discussing the internet research done by students and compared with ascending tracts and with autonomic system. (DA, 1 hours) HW: drawing a diagram of thalamus and of hypothalamus nucleus (PraA, 2 hours)
8	Basal nuclei	RV: watching recorder video on digital tablet explication https://youtu.be/92yUo99_Nc0 (AA, 1 hour) BR: reading chapter 8 from the neuroanatomy book (pages 276-287) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 1 hour) PCSA: search on internet about Parkinson disease. (IA, 2 hours) DCSA: discussing the internet research done by students about direct and indirect pathways. (DA, 1 hours) HW: drawing a schematic diagram of direct and indirect pathways (PraA, 1 hours)
9	Cerebellum	RV: watching recorder video on digital tablet explication https://youtu.be/wN6BYQoxgxI (AA, 2 hour) BR: reading chapter 8 from the neuroanatomy book (pages 318-336) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link

		(AA, 2 hour) PCSA: search on internet about cerebellar syndromes. (IA, 2 hours) DCSA: discussing the internet research done by students and compared cerebellar corrections. (DA, 1 hours) HW: drawing a cerebellar humanculus (PraA, 1 hours)
10	The limbic system	RV: watching recorder video on digital tablet explication https://youtu.be/ZKmFQnN7BRA (AA, 1 hour) BR: reading chapter 9 from the neuroanatomy book (pages 343-356) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour) PCSA: search on internet about Papez circuit. (IA, 1 hours) DCSA: discussing the internet research done by students the role of limbic system. (DA, 1 hours) HW: drawing a coronal section in hippocampus (PraA, 2 hours)
11	Cerebral cortex	RV: watching recorder video on digital tablet explication https://youtu.be/PpF-YmS-t4U (AA, 2 hour) BR: reading chapter 10 from the neuroanatomy book (pages 359-377) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour) PCSA: search on internet about cortex function and lesions. (IA, 2 hours) DCSA: discussing the internet research done by students and explain the principal of lesions. (DA, 2 hours) HW: drawing a the cerebral aspects and Brodman's area(PraA, 2 hours)
12	The vascular system of the brain, meninges and ventricles	RV: watching recorder video on digital tablet explication https://youtu.be/HFekkax-oZo https://youtu.be/Wg1TSSGzTas (AA, 2 hour) BR: reading chapter 11 from the neuroanatomy book (pages 385-423) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour)

		PCSA: search on internet about dural hematomas. (IA, 2 hours) DCSA: discussing the internet research done by students and explain the principal of lesions. . (DA, 2 hours) HW: drawing the vascular circle of Willis (PraA, 2 hours)
13	13. Injuries to the nervous system	RV: watching recorder video on digital tablet explication https://youtu.be/wN6BYQoxgxI (AA, 2 hour) BR: reading chapter 12 from the neuroanatomy book (pages 441-456) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour) PCSA: search on internet about nervous lesions. (IA, 2 hours) DCSA: discussing the internet research done by students and explain the principal of lesions. . (DA, 2 hours) HW: highlight the ischemic part on the previously drawed sections of spinal cord and brainstem (PraA, 2 hours)
14	Autonomic system	RV: watching recorder video on digital tablet explication https://youtu.be/aAM8XM9MdhY (AA, 2 hour) BR: reading chapter 9 from the neuroanatomy book (pages 463-482) https://drive.google.com/file/d/10ardKY6RZxbmYXAlnWILUOy5_w1WLco3/view?usp=share_link (AA, 2 hour) PCSA: search on internet about sympathetic and parasympathetic functions. (IA, 1 hours) DCSA: discussing the internet research done by students. (DA, 1 hours) HW: drawing a schematic diagram of autonomic system(PraA, 2 hours)

Anatomy 3 (neuroanatomy) University of Damascus 2020

1. Eliot Manccall, David Broke, Gray's Clinical Neuroanatomy, Elsevier, 2011
2. Richard Drake, Gray's Anatomy for students, 2end edition, Elsevier, 2007
3. Frank Netter, Netter Atlas of Anatomy, 4rd edition, Elsevier 2014
4. Keith Moore, Clinically oriented anatomy, 6th edition, Lippincott Williams & Wilkins 2010
5. Richard Snell, Snell : Clinical anatomy, 6th edition, Lippincott Williams & Wilkins 2010

Assessment	
scientific activities	(%10)
midterm practical exam	(%10)
Final practical exam	(%10)
Final l exam	MCQs (%70)
Total	(%100)

Course coordinator:

Dr Bayan ALSAID