



Course Syllabus - MBBCh

1. Course Name: Neuroscience Module		Course Code: NSC31	
2. Credit/contact hours:	Total Contact hours: 163 Theoretical: 124 Practical: 26 Others: 13		
3. Number of weeks	8 weeks		
4. Level/year at which this course is offered:	MBBCh Y3- Semester 1		
5. Pre-requisites for this course (if any): MBBCh Y1, Y2 (Autonomic Nervous System, Head & Neck)			
6. Teaching Faculty: Prof. Elmardi- Prof. Magda- Prof. Nadiah- Prof. Shefaa- Dr. Sadaf- Dr. Aprajita- Prof. Ghazala- Prof. Tasneem- Dr. Shifan- Dr. Eslam- Dr. Rania- Dr. Mariam- Dr. Dina- Prof. Samia- Dr. Michael- Dr. Maha- Dr. Iman- Dr. Sarah- Dr. Hiba Ismail- Dr. Hiba Faiz			

Course Description

- This module will provide a detailed understanding of the structure and function of the nervous system. Basic neurosciences will be distributed fairly over eight weeks under specific integrated themes.

1 -Overall Aims of Course:

- To provide a broad understanding of the structure and function of the nervous system with a depth of knowledge in cellular/molecular or behavioural/cognitive perspectives.
- To enable students to use neuroscience research techniques to conduct research.
- To enable the development and application of appropriate professional attitudes, communication and problem-solving skills.
- To provide students with an appropriate background covering the common and important Neurological disorders and emergencies.

Course Delivery Plan

	#	Lecture Title	Instructor	Mode of delivery	Subject
Week 1	1	Introduction to Neuroanatomy	Prof. Elmardi	Lecture	Anatomy
	2	Organization and divisions of the nervous system	Dr.Sadaf	Lecture	Physiology
	3	Topography of the Brain	Prof. Shefaa	Lecture	Anatomy
	4	Early Development of CNS	Dr. Shifan	Lecture	Anatomy
	5	The meninges and the blood-brain barriers	Prof. Nadia	Lecture	Histology
	6	Congenital anomalies of CNS	Dr. Shifan	Lecture	Anatomy
	7	Neisseria meningitidis & acute meningitis	Prof. Magda	Lecture	Microbiology
	8	Neural synapses, neurotransmitters, and properties of synaptic transmission	Dr. Aprajita	Lecture	Physiology
	9	Free living Amoeba	Dr. Dina	Lecture	Parasitology
	10	Cerebral hemispheres & Cortical areas	Prof. Elmardi	Lecture	Anatomy
	11	Brain ventricles & CSF circulation	Prof. Elmardi	Lecture	Anatomy
	12	Blood supply of the brain I	Prof. Elmardi	Lecture	Anatomy
	13	Cerebrum & Cerebellum	Prof. Nadia	Lecture	Histology
	14	Blood supply of the brain II	Prof. Elmardi	Lecture	Anatomy
	15	Cerebrovascular disorders	Dr. Mariam	Lecture	Pathology
	16	Cerebral hemispheres	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	17	Simulation (Surface Anatomy of the Brain)	Dr. Shifan/ Dr. Sarah	Practical	
Week 2	18	Topography of the spinal cord	Prof. Elmardi	Lecture	Anatomy
	19	Microscopic structure of the spinal Cord	Prof. Nadia	Lecture	Histology
	20	Echo & Coxsackie viruses (Viral meningitis)	Prof. Magda	Lecture	Microbiology
	21	Topography of the Brain stem	Prof. Elmardi	Lecture	Anatomy
	22	The brain stem - Mid brain	Prof. Nadia	Lecture	Histology
	23	Epidemiology & Prevention of Rabies	Dr. Michael	Lecture	Public Health
	24	The brain stem - Pons	Prof. Nadia	Lecture	Histology
	25	The brain stem - Medulla	Prof. Nadia	Lecture	Histology
	26	The peripheral nervous system I	Prof. Elmardi	Lecture	Anatomy
	27	The peripheral nervous system II	Prof. Elmardi	Lecture	Anatomy
	28	Demyelinating Diseases & Prion Disease	Prof. Ghazala	Lecture	Pathology
	29	Introduction to CNS pharmacology	Prof. Tasneem	Lecture	Pharmacology
	30	Brain stem- cranial nerves Nuclei	Prof. Elmardi	Lecture	Anatomy
	31	Rabies & ARBO viruses (Encephalitis)	Prof. Magda	Lecture	Microbiology
	32	Hydrocephalus	Dr. Mariam	Lecture	Pathology
	33	Epidemiology and prevention of Encephalitis	Dr. Michael	Lecture	Public Health
	34	Microscopic structure of the spinal Cord	Prof. Nadia/ Dr. Hiba	Practical	Histology
	35	Morphology of the spinal cord	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	36	Brain stem morphology	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	37	Pathology of CNS infections	Dr. Mariam	Tutorial	Pathology
Week 3	38	The structure of sensory receptors	Prof. Elmardi	Lecture	Anatomy

	39	Types & Properties of Sensory receptors	Dr. Sadaf	Lecture	Physiology
	40	Sensory coding	Dr. Sadaf	Lecture	Physiology
	41	Ascending pathways	Prof. Elmardi	Lecture	Anatomy
	42	Thermal sensations, Touch & Proprioceptive sensations	Dr. Sadaf	Lecture	Physiology
	43	The physiology of pain	Dr. Sadaf	Lecture	Physiology
	44	The trigeminal nerve	Prof. Elmardi	Lecture	Anatomy
	45	Brain abscess & Fungal CNS infection	Prof. Magda	Lecture	Microbiology
	46	Toxoplasmosis	Dr. Dina	Lecture	Parasitology
	47	Visceral sensation	Prof. Elmardi	Lecture	Anatomy
	48	The facial nerve	Prof. Elmardi	Lecture	Anatomy
	49	The glossopharyngeal & vagus nerves	Prof. Elmardi	Lecture	Anatomy
	50	The Thalamus & its connections	Prof. Elmardi	Lecture	Anatomy
	51	Epidemiology of Toxoplasmosis	Dr. Michael	Lecture	Public Health
	52	Opioid Analgesics I	Prof. Tasneem	Lecture	Pharmacology
	53	Sensory disorders	Dr. Sadaf	Lecture	Physiology
	54	Opioid Analgesics II	Prof. Tasneem	Lecture	Pharmacology
	55	Simulation: Lumbar Puncture	Dr. Hajer/ Dr. Rawan/ Dr. Yassein	Simulation	Clinical Skills
	56	Simulation: Lumbar Puncture	Dr. Hajer/ Dr. Rawan/ Dr. Yassein	Simulation	Clinical Skills
	57	Brain stem Microstructure	Prof. Nadia/ Dr. Hiba	Practical	Histology
	58	Brain stem Microstructure	Prof. Nadia/ Dr. Hiba	Practical	Histology
	59	Anatomy Practical	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	60	Internal and external features of the cerebrum	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	61	Examination of somatosensation	Dr. Aprajita/ Dr. Iman	Practical	Physiology
Week 4	62	Development of eye and ear	Dr. Shifan	Lecture	Anatomy
	63	Eyeball, outer layer, middle	Prof. Nadia	Lecture	Histology
	64	Retina, Eyelid & Lacrimal glands	Prof. Nadia	Lecture	Histology
	65	Visual pathway	Prof. Elmardi	Lecture	Anatomy
	66	The physiology of vision	Dr. Aprajita	Lecture	Physiology
	67	Error of refractions	Dr. Aprajita	Lecture	Physiology
	68	Retinal adaptation Colour vision & blindness	Dr. Aprajita	Lecture	Physiology
	69	Ocular Pathology	Prof. Ghazala	Lecture	Pathology
	70	The structure of the ear	Prof. Nadia	Lecture	Histology

	71	Parasites affecting the eye	Dr. Dina	Lecture	Parasitology
	72	The vestibular pathway	Prof. Shefaa	Lecture	Anatomy
	73	The cochlear pathway	Prof. Shefaa	Lecture	Anatomy
	74	The Physiology of hearing & balance	Dr. Aprajita	Lecture	Physiology
	75	Nerve supply of the tongue	Prof. Elmardi	Lecture	Anatomy
	76	The olfactory pathway	Prof. Elmardi	Lecture	Anatomy
	77	Olfactory & gustatory sensations	Dr. Aprajita	Lecture	Physiology
	78	CNS Tumors	Prof. Ghazala	Lecture	Pathology
	79	The basal nuclei	Prof. Elmardi	Lecture	Anatomy
	80	Basal Nuclei (connections and function)	Dr. Sadaf	Lecture	Physiology
	81	The eye, ear & nasal cavity	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	82	Pupillary reflexes & Visual acuity	Dr. Aprajita/ Dr. Iman	Practical	Physiology
	83	Microstructure of special sense organs.	Prof. Nadia/ Dr. Hiba	Practical	Histology
	84	Hearing tests	Dr. Aprajita/ Dr. Iman	Practical	Physiology
	85	Fundoscopy, otoscopy	Prof. Samia/ Dr. Rawan	Simulation	Clinical Skills
Week 5	86	Classification and properties of reflexes	Dr. Aprajita	Lecture	Physiology
	87	Stretch reflex & Muscle Receptors	Dr. Aprajita	Lecture	Physiology
	88	The cerebellum	Prof. Shefaa	Lecture	Anatomy
	89	Functions of Cerebellum	Dr. Sadaf	Lecture	Physiology
	90	Fibres of the cerebrum	Prof. Elmardi	Lecture	Anatomy
	91	Descending pathways	Prof. Elmardi	Lecture	Anatomy
	92	Functions of Pyramidal & extrapyramidal pathways	Dr. Sadaf	Lecture	Physiology
	93	Motor Cranial Nerves III, IV, VI & XII	Prof. Elmardi	Lecture	Anatomy
	94	Complete transection, Hemi-& Quadrisection of the spinal cord	Dr. Sadaf	Lecture	Physiology
	95	Nervous lesions, internal capsule lesions	Dr. Sadaf	Lecture	Physiology
	96	Movement disorders 1	Prof. Elmardi	Lecture	Anatomy
	97	Movement disorders 2	Prof. Elmardi	Lecture	Anatomy
	98	Antiparkinsonian drugs I	Dr. Eslam	Lecture	Pharmacology
	99	The prefrontal cortex	Prof. Elmardi	Lecture	Anatomy
	100	Microscopic structure of the cerebral cortex	Prof. Nadia	Lecture	Histology
	101	Antiparkinsonian drugs II	Dr. Eslam	Lecture	Pharmacology
	102	Examination of the motor function	Dr. Aprajita/ Dr. Iman	Practical	Physiology
	103	Cerebellum & diencephalon	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	104	Pathology Practical	Dr. Maha	Practical	Pathology
	105	Examination of motor cranial nerves	Dr. Aprajita/ Dr. Iman	Practical	Physiology
	106	Occupational Physical Hazard	Dr. Iman/ Dr. Hiba	Practical	Public Health

Week 6	107	The reticular formation	Prof. Elmardi	Lecture	Anatomy
	108	Learning, memory & and intellectual functions	Dr. Aprajita	Lecture	Physiology
	109	Learning & Behavioral Modification	Prof. Samia	Lecture	Behavioural Science
	110	Language & Speech	Dr. Aprajita	Lecture	Physiology
	111	Antiepileptic drugs I	Dr. Eslam	Lecture	Pharmacology
	112	The reticular activating system, consciousness & Sleep	Dr. Sadaf	Lecture	Physiology
	113	Antiepileptic drugs II	Dr. Eslam	Lecture	Pharmacology
	114	African Trypanosomiasis	Dr. Dina	Lecture	Parasitology
	115	Slow viral infection & Prion mediated disease	Prof. Magda	Lecture	Microbiology
	116	Sleep disorders	Prof. Samia	Lecture	Behavioural Science
	117	Sedatives & hypnotics I	Dr. Rania	Lecture	Pharmacology
	118	Dementia & Alzheimer's disease	Prof. Elmardi	Lecture	Anatomy
	119	Sedatives & hypnotics II	Dr. Rania	Lecture	Pharmacology
	120	Degenerative Disorders	Prof. Ghazala	Lecture	Pathology
	121	General Anesthesia	Prof. Tasneem	Lecture	Pharmacology
	122	Local Anesthetics	Prof. Tasneem	Lecture	Pharmacology
	123	Higher sensory and motor functions	Prof. Elmardi	Lecture	Anatomy
	124	Examination of the mental statu	Prof. Elmardi	Practical	Anatomy
	125	History from a person suffering from a neurological problem	Prof. Samia	Simulation	Clinical Skills
	126	Demonstration and culture of CNS pathogens	Prof. Magda	Practical	Microbiology
127	Case-based prescription	Dr. Eslam	Practical	Pharmacology	
Week 7	128	Structural components of the limbic system	Prof. Elmardi	Lecture	Anatomy
	129	The hypothalamus	Prof. Elmardi	Lecture	Anatomy
	130	Functions of the hypothalamus & the limbic system	Dr. Sadaf	Lecture	Physiology
	131	Neuroimaging	Prof. Elmardi	Lecture	Anatomy
	132	Antipsychotic medicines	Dr. Rania	Lecture	Pharmacology
	133	Personality disorders	Prof. Samia	Lecture	Behavioural Science
	134	Antimanic medicines	Dr. Rania	Lecture	Pharmacology
	135	Antidepressants	Dr. Rania	Lecture	Pharmacology
	136	Management of Anxiety disorders	Dr. Rania	Lecture	Pharmacology
	137	Biochemistry Revision/ Neurotransmitters	Prof. Nagla	Lecture	Biochemistry
	138	The hypothalamus & the limbic system	Dr. Shifan/ Dr. Sarah	Practical	Anatomy
	139	Parasitology Practical	Dr. Dina	Practical	Parasitology
	140	X-rays, CT scans, angiograms, and MRIs of the nervous system	Dr. Shifan/ Dr. Sarah	Practical	Anatomy

	141	Emotional intelligence	Ms. Shireen	Tutorial	Behavioural Science
	142	Evaluation of a patient with psychological symptoms	Prof. Samia	Tutorial	Behavioural Science
	143	Case based prescription writing	Prof. Tasneem	Practical	Pharmacology
	144	Emotional disturbances (TBL)		TBL	Behavioural Science
	145	Emotional disturbances (TBL)		TBL	Behavioural Science
	146	Paranormal Phenomena	Prof. Elmardi	Seminar	
	147	Paranormal Phenomena	Prof. Elmardi	Seminar	
	148	Paranormal Phenomena	Prof. Elmardi	Seminar	
	149	Paranormal Phenomena	Prof. Elmardi	Seminar	
Week 8	150	Anatomy Revision	Prof. Elmardi	Lecture	Anatomy
	151	Anatomy Revision	Prof. Elmardi	Lecture	Anatomy
	152	Physiology Revision	Dr. Aprajita	Lecture	Physiology
	153	Physiology Revision	Dr. Aprajita	Lecture	Physiology
	154	Histology Revision	Prof. Nadia	Lecture	Histology
	155	Histology Revision	Prof. Nadia	Lecture	Histology
	156	Pharmacology Revision	Dr. Rania	Lecture	Pharmacology
	157	Pharmacology Revision	Dr. Rania	Lecture	Pharmacology
	158	Public Health Revision	Dr. Michael	Lecture	Public Health
	159	Public Health Revision	Dr. Michael	Lecture	Public Health
	160	Microbiology Revision	Prof. Magda	Lecture	Microbiology
	161	Microbiology Revision	Prof. Magda	Lecture	Microbiology
	162	Parasitology Revision	Dr. Dina	Lecture	Parasitology
	163	Parasitology Revision	Dr. Dina	Lecture	Parasitology

Course Learning Outcomes

CLOs		Aligned-PLOs
K1	Describe the macrostructure and microstructure and functions of the brain, spinal cord, meninges and the supporting tissue in health and disease.	A1
K2	Explain the underlying causes of major classes of nervous system disease and explain major clinical findings based on pathophysiologic principles	A2
K3	Relate the changes in emotions, behavior and personality by recalling the structure and functions of limbic system	A3

CLOs		Aligned-PLOs
K4	Describe the mechanisms of action and therapeutic targets of the major therapeutic classes used in the treatment of nervous system diseases, and the various types of drugs of abuse.	A3
K5	Describe the pathways of special senses (vision, hearing, smell and taste) and discuss the pathologic features of major diseases of the eye.	A1
K6	Corelate the potential sites of neurological lesions based on neurological dysfunction signs and symptoms.	A2
K7	Describe a logical therapeutic approach to nervous system disease based on pathoanatomy, pathophysiology, and pharmacology principles.	A2
K8	List the major psychiatric disorders' diagnostic classification, clinical features, differential diagnoses, typical course and prognosis, as well as their common comorbid conditions and mental status findings.	A1
S1	Analyze results of laboratory and radiological CT scans and MRI's to diagnose and manage patients with neurological diseases and analyze clinical signs and symptoms of nervous system diseases in order to organize/build a differential diagnosis.	B2
A1	Demonstrate awareness of the impact of common nervous system diseases as well as psychological disorders on the quality of life of the individual and community and the preventive strategies.	C1

Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
k1	Describe the macrostructure and microstructure and functions of the brain, spinal cord, meninges and the supporting tissue in health and disease.	L SBIL/ CBL/ SDL/ SGD/ PBL/ TBL ICM Practical	Mid-comprehensive Final comprehensive OSPE/OSCE Practical
k2	Explain the underlying causes of major classes of nervous system disease and explain major clinical findings based on pathophysiologic principles	L SBIL/ CBL/ SDL/ SGD/ PBL/ TBL ICM Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
k3	Relate the changes in emotions, behavior and personality by recalling the structure and functions of limbic system	L TBL Tutorial Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
k4	Outline the mechanisms of action and therapeutic targets of the major therapeutic classes used in the treatment of nervous system diseases, and discuss the various types of drugs of abuse.	L PBL/ TBL Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
k5	Describe the pathways of special senses (vision, hearing, smell and taste) and discuss the pathologic features of major diseases of the eye.	L Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
s1	Interpret the potential sites of neurological lesions based on neurological dysfunction signs and symptoms.	L SBIL/ CBL/ SDL/ Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
s2	Develop a logical therapeutic approach to nervous system disease based on patho-anatomy, pathophysiology, and pharmacology principles.	L CBL Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
s3	Analyze results of laboratory and radiological CT scans and MRI's to diagnose and manage patients with the neurological diseases Analyze clinical signs and symptoms of nervous system diseases in order to organize/build a differential diagnosis.	L Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
s4	Practice the major psychiatric disorders' diagnostic classification, clinical features, differential diagnoses, typical course and prognosis, as well as their common comorbid conditions and mental status findings.	L CBL/ Tutorial Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
S5	Practice the major psychiatric disorders' diagnostic classification, clinical features, differential diagnoses, typical course and prognosis, as well as their common comorbid conditions and mental status findings.	L Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical
A1	Demonstrate awareness of the impact of common nervous system diseases as well as psychological disorders on the quality of life of the individual and community and plan preventive strategies.	L Practical	Mid-comprehensive Final comprehensive OSPE/OCE Practical

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score	Date
2	Continuous assessments (Attendance, Quiz, projects, Assignments, Presentations Clinical Skills, mid term)	Throughout the module	30%	Midterm on 7 November 2022
3	Final comprehensive exam (MCQ's, Oral, OSPE)	End of semester	70%	6 Dec 2022

*Assessment task (i.e., written test, oral test, oral presentation, group project etc.)

Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<p>Anatomy: Ryan Splittgerber.(2019) Snell's clinical neuroanatomy (8th Edition) Wolters Kluwer. Arthur F. Dalley II PhD FAAA (Author), Anne M. R. Agur B.Sc. (OT) M.Sc PhD (Author).(2022) Moore's clinically oriented anatomy (9thEd.) Wolters Kluwer</p> <p>Lawrence E. Wineski, (2019) Snell's clinical anatomy by regions (10th Ed.) Wolters Kluwer,</p>
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	<p>Agur, Anne M.R, Dalley II, Arthur F. (2021). Grant's: Atlas of anatomy (17th edition). Philadelphia: Wolter Kluwer.</p> <p>T.W. Sadler (2019) Langman's medical embryology (14th edition) Wolters Kluwer</p> <p>Histology Leslie P. Gartner, James L. Hiatt (2023) Color Atlas and text, histology (8th ed.) Wolters Kluwer Health</p> <p>Biochemistry Denise R. Ferrie(2017) Biochemistry (7th Edition) Wolters Kluwer.</p> <p>Community Medicine Kenneth Fuller Maxcy, Milton Joseph Rosenau, John M. Last, Robert B (2022). Maxcy-Rosenau-Last public health & preventive medicine (16ed). Elsevier.</p> <p>Microbiology Stefan Riedel (Author), Stephen Morse (Author), (2019) Jawetz Melnick & Adelbergs Medical Microbiology (28th Ed.) McGraw-Hill Education</p> <p>Parasitology Zeibig Elizabeth A. (2013) Clinical Parasitology: A Practical Approach.(2nd) Saunders / Elsevier,</p> <p>Pathology: Pathology: Kumar, V., Abbas, A. K., & Aster, J. C. (2018). Robbins Basic Pathology (10th ed.). Elsevier - Health Sciences Division.</p> <p>Pharmacology Bertram G. Katzung, MD, PhD, Marieke Kruidering-Hall, (2021) Katzung & Trevor's pharmacology: examination & board review (13th ed.) McGraw-Hill</p> <p>Laurence L. Brunton ; associate editors, Björn C. Knollmann, Randa Hilal-Dandan (2018) Goodman & Gilman's the pharmacological basis of therapeutics (13) McGraw Hill Medical</p> <p>Physiology: Hall, J. E., & Hall, M. E. (2021, June 16). Guyton and Hall Textbook of Medical Physiology (14th ed.). Elsevier</p> <p>Clinical Skills: MacLeod's clinical exam (14th ed.) 2018 Elsevier Churchill Livingstone</p>
<p>References Materials</p>	<p>Anatomy: Richard Drake PhD (Author), A. Wayne Vogl (Author), Adam W. M. Mitchell (2015). Gray's Anatomy for Students (3rd edition). Arcturus Publishing.</p> <p>T.W. Sadler (2019) Langman's medical embryology (14th Ed.) Wolters Kluwer</p>

	<p>Thomas R. Gest, Patrick W. Tank (2020) Lippincott atlas of anatomy (2nd Ed.) Wolters Kluwer</p> <p>Histology: Anthony L. Mescher Junqueira (2018). Basic histology text and atlas (15th ed) McGraw-Hill Education.</p> <p>Biochemistry: Michael Lieberman (2018) Marks' basic medical biochemistry : a clinical approach (5th Ed.) Wolters Kluwer</p> <p>Murray, Robert K.; Bender, David; Botham (2012) Harpers Illustrated Biochemistry (29th) McGrawHill Medical</p> <p>Microbiology: Patrick R Murray; Ken S Rosenthal; Michael A Pfaller.(2020) Medical microbiology (9th Ed.) Elsevier</p> <p>Parasitology: John, D. T., & Petri, W. A. (2006). Markell and Voge's medical parasitology (9th Ed.). Elsevier Health Sciences.</p> <p>Pathology: Pathology: Strayer DS, Rubin E, Saffitz JE, Schiller AL (2019). Rubin's Pathology: Mechanisms of Human Disease. Lippincott-Wolters Kluwer.</p> <p>Pharmacology Tripathi, K. D. (2019). Essentials of Medical Pharmacology (8th Ed.) Jaypee Brothers Medical Publishers</p> <p>Whalen, K. (2019). Lippincott Illustrated Reviews: Pharmacology. (7th Ed.) Wolters Kluwer Health/Lippincott Williams & Wilkins</p> <p>Physiology: Barrett , Scott Boitano , Susan M. Barman (2016) Ganong's review of medical physiology (26th ed.) McGraw-Hill Education</p>
<p>Electronic Materials</p>	<ul style="list-style-type: none"> • EBSCO e-Books Clinical Collection: • Amboss • Access-pharmacy • Up to date
<p>Other Learning Materials</p>	<ul style="list-style-type: none"> • https://nba.uth.tmc.edu/neuroscience/m/index.htm • https://learninglink.oup.com/access/neuroscience-sixth-edition-student-resources#tag_animations

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories, demonstration rooms, simulation lab, Museums
Technology Resources (AV, data show, Smart Board, software, etc.)	LMS, AV, data show, Smart Board

Couse Coordinator: Prof. Abdelmoneim Elmardi :
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Instructors:

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