Course Specifications

General Information

Course name	Neuroscience I
Course number	MDCN3521
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	5
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Introduction to Neuroscience: Gain a fundamental understanding of the structure and function of the nervous system.
2 - Neuroanatomy: Study the anatomy of the brain, spinal cord, and peripheral nervous system.
3 - Neurophysiology: Learn about the electrical and chemical signaling mechanisms within the nervous system.
4 - Developmental Neuroscience: Explore the development of the nervous system from embryonic stages to adulthood
5 - Sensory Systems: Understand how the brain processes information from various sensory modalities such as vision, hearing, touch, taste, and smell.
6 - Motor Systems: Study the neural mechanisms involved in controlling movement and coordination
7 - Cognitive Neuroscience: Examine the relationship between the brain and higher cognitive functions like memory, attention, language, and decision-making

Intended Learning Outcomes

Knowledge and Understanding	* Identify and describe the gross anatomy of the central nervous system, including its blood supply as well as the ventricular system * Describe the anatomy of meninges, CSF circulations and various infections leading to meningitis * Understand the neural signaling, synaptic transmission, and the different neurotransmitter systems (synthesis, mechanism of action and final destination) * Understand the anatomical-physiological basis of upper and lower motor neurons and the complex circuits involved in motor control * Understand the somatic sensory system, the different afferent fibers, their pathway, thalamic relay and cortical integration * Thoroughly understand the mechanism of nociception, its types, pathway, central integration as well as the array of its therapeutic managemen * Describe the anatomy of the eye and the physiology of the visual system and its central integration and the different pathologies afflicting the eye * Understand the mechanisms of hearing and balance and the anatomy of the relevant organs and nerves * Describe the anatomy of the tongue and palate and understand the mechanism of deglutition through assimilating the anatomy and function of bulbar cranial nerves * Describe the anatomy of neck triangles and the blood supply and nerves of the neck
Intellectual Skills	* Integrate the basic anatomical & physiological facts of the central nervous system with clinical data * Correlate functional alterations of common pathological conditions and diseases of the central nervous system with clinical data * Use problem solving skills in a variety of practical and clinical situations related to the central nervous system.
Professional Skills	* Compare the structure of somatic and autonomic reflex arcs * Analyze the CSF * Comment on the effect of drugs that affect autonomic function on cardiac and intestinal muscles, and their effect in vivo on heart rate and blood pressure * Determine the effect of the autonomic nervous system on the regulation of the various organ systems.
General Skill	* Respect superiors, colleagues and any other members of the health profession * Communicate ideas and arguments effectively. * Be prepared for the lifelong learning needs of the medical profession. * Work constructively and cooperatively within a team * Practice self and peer evaluation & Manage time effectively

Course Contents

1 - Gross Anatomy of the Nervous System (Brain and Spinal cord), Skull & Meninges
2 - Ventricular System, CSF and Blood Supply of the NS
3 - Histology of the Nervous System (Central & PNS)
4 - Functional Anatomy of the Central Nervous System
5 - Physiology of Brain Circulation & CSF Formation
6 - Development of the Nervous System Development of the Head and Neck
7 - Bacterial Meningitis and Brain Abscess
8 - Viral Meningitis & Viral Encephalitis Tetanus and Botulism
9 - Main Functions of Cranial and Spinal nerves
10 - Special Metabolism of the Brain Neurotransmitters: Types and Life Cycle
11 - Anatomy of Brain Stem (Medulla Oblongata. Pons, MB)
12 - Autonomic Nervous System: - Sympathetic & Para-Sympathetic. - Cholinergic and Adrenergic. - Life Cycle of Adrenaline & Acetylcholine
13 - Autonomic Drugs
14 - Anatomy of the Motor Cortex, Basal Ganglia and cerebellum Spinal Cord and its Tracts (Ascending and descending)
15 - Cortical and Sub-Cortical Motor Centers & Pathways Upper & Lower motor neurons Physiology
16 - Cerebrum and Control of Movement Cerebellum and Control of Balance
17 - Malformation, Edema & Parenchymal Injury
18 - Malformation, Edema & Parenchymal Injury
19 - Cerebrovascular Diseases Degenerative Disorders of the CNS-1
20 - Anatomy of cranial nerves
21 - Cerebrovascular Diseases Degenerative Disorders of the CNS-1
22 - Types of Receptors, Sensations and Sense Organs Somatic Sensory System (Receptors, Transduction, Pathways)
23 - Pain Sensation & Anaesthesia
24 - Opioids and Opioid Antagonists Analgesics
25 - Local Anaesthetics General Anaesthetics
26 - Development of the Face, Eye and Ear
27 - Visual System: Neurophysiology of Vision, Retina & Visual Pathways
28 - Diseases of the Eye Drugs used in Ophthalmic Diseases
29 - Physiology of Auditory System
30 - Vestibular System (Rotational and Linear Movement)
31 - Diseases of the Auditory & Vestibular Systems Neoplasms of the CNS
32 - Chemical Sensations: Taste and Smell
33 - Reflexes: (Somatic & Autonomic)

Teaching and Learning Methods

1 - Lectures, where professors or experts in the field deliver presentations on various topics. They provide an overview of the content, introduce key concepts, and explain complex theories and principles.
2 - laboratory sessions where students engage in hands-on activities.
3 - Discussions: Small group discussions or tutorials are used to encourage active participation and critical thinking.
4 - multimedia resources, such as videos, interactive online modules, and virtual reality applications

Students Assessment

Assessment Method	TIME	MARKS
Paper One Exam		50 %
Paper Two Exam		30 %
Practical Sessions		20 %

Books and References

Recommended books	Snell's Clinical Neuroanatomy, (latest edition)
	Grants Atlas of Anatomy or any other reasonable colored atlas of Human Anatomy
	Before we are born. By K.L. Moore and T.V.N. Persaud, (latest Edition)
	Textbook of Medical Physiology, by Guyton and Hall, (latest edition)
	Pharmacology, Lippincott's Illustrated Review, (latest edition)
	Basic and clinical pharmacology, Katzung and Trevor, (latest edition)
	Basic Histology, by L.Carlos Junqueira, Jose Carneiro, Bobert O. Kelley, (latest edition)
	Wheater's Functional Histology by, H.G. Buikitt B. Young, J.W. Heath, (latest edition)
	Basic Pathology, Kumar, W.B. Saunders, (latest edition)
	Review of Medical Microbiology and Immunology, Levinson, W. (latest edition)