

## Lectures Topics and Subjects

<b>TOPIC</b> <b>(SUBJECTS&amp; NUMBER</b> <b>OF LECTURES/</b> <b>SUBJECT)</b>	<b>SUBJECT</b>	<b>CONTENTS</b>
<u><b>T1: Introduction</b></u> <u><i>5 lectures:</i></u> Anatomy 1 Physiology 1 Biochemistry 1 Pharmacology 1 Pathology 1	<u><b>*Anatomy:</b></u> -An introduction to the nervous System.	Review the structure of the central, peripheral & autonomic nervous systems.
	<u><b>*Physiology:</b></u> Synaptic transmission and neuronal pools	-Communication within neurons -types of synaptic receptors - Types of postsynaptic potentials and summations. -Processing of signals within neuronal pools (divergence, convergence, prolongation and sharpening of signals).
	<u><b>*Biochemistry:</b></u> - Biochemistry of CNS neurotransmitters	-Catecholamines Synthesis and Catabolism -Histamine Synthesis and Catabolism -Serotonin -Glutamate. The Glutamate-Glutamine Cycle in the Brain, GABA ( $\gamma$ -Aminobutyric acid).
	<u><b>*Pharmacology:</b></u> -Drugs and synaptic transmission	<ul style="list-style-type: none"> <li>- Revision of action potential, synapse, neurotransmitters and neurotransmitter's cycle</li> <li>- Revision of Excitatory Postsynaptic Potentials (EPSP) and Inhibitory Postsynaptic Potentials (IPSP)</li> <li>- Revision of CNS receptors implicated in the actions of most commonly used drugs</li> <li>- Overview on the principal drug targets in the treatment of CNS disorders</li> </ul>
	<u><b>*Pathology :</b></u> Introduction	-Describe the Patterns Of Injury & Responses ( <i>Markers</i> ) To Injury In The Nervous System. -Describe the Underlying Mechanisms, Causes, Gross Features Of Cerebral Edema -Define the Subfalcine (Cingulate), Transtentorial (Uncinate), & The Tonsillar Hernias & Describe The Effects Of Each One.

<b>T2: Spinal cord &amp; somatic sensations</b> <u>11 Lectures:</u> Anatomy 4 Physiology 4 Pharmacology 2 Community 1	<b>*Anatomy:</b> -The spinal cord: Gross features & Internal structure - Ascending tracts of the spinal cord - Descending tracts of the spinal cord	-Describe the gross and internal features of the spinal cord. -Describe the arrangements of nerve fiber tracts in the spinal cord. - Describe the anterolateral ascending tracts. -Describe the dorsal column tracts. - Describe the muscle-joint pathway to the cerebellum - Describe the spinotectal, spinoreticular, spino- Olivary and visceral sensory tracts. - Identify the different direct and indirect ascending tracts in the spinal cord. - Describe the pyramidal and extra-pyramidal tracts and their functions. - Describe the intersegmental tracts and their significance.
	<b>*Physiology:</b> - Sensory nervous system & Dorsal column sensations - Spinothalamic sensations & Pain control - Spinal Reflexes	-Sensory receptors (generator potential, specificity, adaptation) -Sensory unit and receptive field -Coding of sensory information (modality, locality, intensity). -Modalities of sensations transmitted by dorsal column pathway and Spinothalamic pathways. -Protopathic versus epicritic sensations -Pain (classifications, central perception, referred pain, Headache, pain modulation by CNS: Gate theory& descending analgesia system, stress analgesia). -Monosynaptic (stretch reflex) and polysynaptic spinal reflexes. -Static and dynamic stretch reflex (Muscle tone and Tendon Jerk) -Supraspinal control of stretch reflex, alpha gamma coactivation. -Inverse stretch reflex (muscle tension versus muscle length homeostasis)
	<b>*Pharmacology:</b> - Opioids and opioid antagonists	- Opioid Receptors - Opioid Agonists - Partial Agonists/Mixed Agonist-Antagonist - Opioid Antagonists
	<b>*Community :</b> Epidemiology of Migraine and cluster Headache 1	incidence and prevalence, gender & other demographics risk of 2nd complications attribute to migraines lifestyle factors that can reduce migraines and new studies on effectiveness of TMS
<b>T3: Brain Stem</b> <u>5 Lecture:</u> Anatomy 4 Physiology 1	<b>*Anatomy:</b> -The Brainstem: Medulla oblongata, pons, and midbrain -Cranial nerves	-Describe the structure, functions and components of the brainstem. - Describe the external and internal features of the upper, middle and lower level of the medulla oblongata. -Describe the external & internal features of the pons. - Describe the external & internal features of the midbrain -Describe the red nucleus & its connections. -Describe the different lemnisci. List the cranial nerves I – XII -List the functional components of cranial nerves

		-Describe the motor, sensory and parasympathetic nuclei of the cranial nerves I-XII and their connections
	<b>*Physiology: Reticular Formation</b>	-Sensory Part of the reticular formation -Motor Part of the reticular Formation -Ascending Reticular Activating System {ARAS} (Function, factors affecting the activity of ARAS)
<b><u>T4: Limbic system and Basal Ganglia and Diencephalon</u></b> <b><u>12 Lectures:</u></b> Anatomy 2 Physiology 3 Pharmacology 5 Pathology 2	<b>*Anatomy: The Limbic system and Basal Ganglia</b> Thalamus, epithalamus, subthalamus, hypothalamus	-Describe the limbic system, the structures forming it, its functions and connections. - Describe the components of basal nuclei, their functions, afferent and efferent connections and disorders -Describe the thalamus, the thalamic nuclei, their functions and connections. - Describe the epithalamus, its parts, connections and functions. - Describe the subthalamus. - Describe the hypothalamus, hypothalamic nuclei, and hypothalamic lines of communications, afferent and different connections. -Review the functions of the hypothalamus.
	<b>*Physiology:</b> -Basal Ganglia circuits and Papez circuit , Diencephalon -Memory and learning	-Connections of the basal ganglia (cortical, brain stem, interconnections within the basal ganglia). -Functions of the basal Ganglia -Diseases of the basal ganglia (PD, chorea, athetosis, hemiballismus). -Release Phenomena in CNS, rigidity. -Connections of the limbic system (between its different parts, Papez circuit) , functions of the limbic system. -Synaptic Plasticity (Potentiation, depression, sensitization) -Memory: types, mechanism, consolidation, encoding. -Learning: Non associative, associative. -Thalamus (functions, thalamic syndrome ) -Hypothalamus (Functions, fear and rage)
	<b>*Pharmacology :</b> -CNS stimulants & drugs of abuse -Pharmacology: Antidepressants -Drug therapy for PD and AD -Antipsychotic Drugs	-Addiction/Dependence - Psychomotor Stimulants - Hallucinogens ----- -Depression and Mania -Selective Serotonin Reuptake Inhibitors (SSRI) -Serotonin/Norepinephrine Reuptake Inhibitors (SNRI) -Tricyclic Antidepressants (TCA) -Atypical Antidepressants -Monoamine Oxidase Inhibitors (MAOi) -Serotonin-Dopamine Antagonists

		<p>-Treatment of Mania and Bipolar Disease</p> <p>-----</p> <p>-Drugs Used in Parkinson's Disease</p> <p>-Drugs Used in Alzheimer's Disease</p> <p>-----</p> <p>-Schizophrenia</p> <p>- Antipsychotic Drugs</p>
	<p><b>*Pathology:</b></p> <p>Parkinsonism</p> <p>Alzheimer's disease</p> <p>Huntington Disease</p> <p>AML</p>	<p>-Enumerate the Major Causes of Dementia</p> <p>-Describe the Incidence, Causes, Pathogenesis, Clinical Features, Gross &amp; Microscopic Features (Neuritic Plaques &amp; Neurofibrillary Tangles) of Alzheimer Disease</p> <p>-Define Frontotemporal Dementia</p> <p>-Define Parkinsonism &amp; Enumerate its Causes.</p> <p>-Describe the Gross &amp; Microscopic Features Of Idiopathic Parkinson disease.</p> <p>-Describe the Pathogenesis, Gross &amp; Microscopic, &amp; Clinical Features of Huntington Disease.</p> <p>-Define Friedreich ataxia</p> <p>+++++</p> <p>-Define the diseases of motor neurons</p> <p>-Describe the Gross &amp; Microscopic Features of Amyotrophic Lateral Sclerosis (Motor Neuron Disease),</p> <p>-Define:</p> <p>(1) Bulbospinal Atrophy (Kennedy Disease), &amp;</p> <p>(2) Spinal Muscular Atrophy</p>
<p><b>T5: Cerebellum</b></p> <p><u>3 Lectures:</u></p> <p>Anatomy 1</p> <p>Physiology 2</p>	<p><b>*Anatomy:</b></p> <p>-The Cerebellum</p>	<p>-Describe the cerebellum; its external and internal features, including the intracerebellar nuclei.</p> <p>-Describe the functional areas of the cerebellar cortex and its white matter.</p> <p>- Describe the afferent &amp; efferent connections of the Cerebellum.</p> <p>- Review the signs and symptoms of cerebellar diseases as related to its anatomy.</p>
	<p><b>*Physiology:</b></p> <p>-Cerebellum&amp; Neocerebellar syndrome</p>	<p>-Cerebellar neuronal circuits (mossy and climbing fibers)</p> <p>-Functions of the cerebellum</p> <p>-Neocerebellar syndrome</p> <p>-Nervous control of voluntary movement (planning, execution).</p> <p>-Differences between upper and Lower Neuron Lesions (distribution, muscle tone, atrophy, reflexes, response to electrical stimulation)</p>

<b><u>T6: Cerebral Cortex and Electrical activity of the brain</u></b> <b><u>9 Lectures:</u></b> Anatomy 2 Physiology 3 Pharmacology 4	<b><u>*Anatomy:</u></b> cortical areas + functional significance	-Describe the different lobes, sulci & gyri of cerebral hemispheres. -Describe the functional localization of cerebral cortex and their clinical significance.
	<b><u>*Physiology:</u></b> -Electrical activity of the brain, EEG & Sleep -Upper Motor Neuron Lesion versus lower Motor Neuron Lesion.	Electrical activity of the Brain(Evoked Potentials, spontaneous potentials) EEG waves Physiological changes during sleep types of sleep. mechanisms of sleep, sleep disturbances Main Differences between UMNL and LMNL, Spinal cord transection
	<b><u>*Pharmacology:</u></b> - Pharmacology of sedative-hypnotics - General anesthetics -Drug used in epilepsy	-Benzodiazepines -Benzodiazepine Antagonist -Barbiturates -Other Anxiolytics/Hypnotics ----- -Etiology of Seizures -Types of Seizures -Anti-seizure medications ----- -Adjuncts to Anesthesia -Levels of General Anesthesia -Inhalational Anesthetics -Intravenous Anesthetics -Local Anesthetics
<b><u>T7: Traumatic Brain Injury</u></b> <b><u>1 lecture</u></b> Pathology 1	<b><u>*Pathology:</u></b> - CNS trauma	-Describe the Sites, Gross & Microscopic Features of Recent & Old; Closed & Opened Traumatic Head Injury. -Describe the Cause, Pathologic Features, & Effects of Diffuse Axonal Injury. -Describe the Causes, Sites & Effects of Traumatic: (1) Epidural Hemorrhages (2) Subdural Hemorrhages (Acute & Chronic)
<b><u>T8: Vascular disorders</u></b> <b><u>4 Lectures:</u></b> Anatomy 1 Pathology 3	<b><u>*Anatomy:</u></b> Blood supply of the brain and spinal cord	-Describe the arterial blood supply of the brain. -Describe the circle of Willis. -Describe the veins of the brain.
	<b><u>*Pathology:</u></b>	-Define the Term Cerebrovascular Disease (Thrombotic & Embolic Occlusion of Vessels, & Vascular Rupture. -Describe the Causes, Gross & Microscopic (Early, Subacute, & Repair) Changes, & Outcomes of Global Cerebral Ischemia +++++ -Enumerate the Sources of Emboli & Sites of In Situ Thrombosis In The Cerebral Circulation. -Describe the Sites, Types, Gross & Microscopic Changes of Early & Late Cerebral Infarction Classify The Intracranial Hemorrhages

		<p>-Describe the Cause (S), Sites, Effects, Gross &amp; Microscopic Features of Recent &amp; Old:  <b>Primary Brain Parenchymal Hemorrhage.</b>  <b>Subarachnoid Hemorrhage</b>  -Describe the Pathologic Features of Berry saccular aneurysms &amp; Vascular Malformations.  +++++</p> <p>-Describe the Effects Of Hypertensive Cerebrovascular Disease, Including:  (1) Massive Hypertensive Parenchymal Hemorrhage (2) Lacunar Infarcts, (3) Slit Hemorrhage, &amp; (4) Hypertensive Encephalopathy.</p>
<b>T9: Ventricles of the Brain</b> <b>4 Lectures:</b> <b>Anatomy 2</b> <b>Pathology 2</b>	<u><b>*Anatomy:</b></u> -Ventricles of the Brain, Dural folds, CSF	-Describe the dura, arachnoid and pia mater of the brain & spinal cord. - Describe the dural folds. -Describe the dural venous sinuses. -Describe the lateral ventricles, third ventricle, Cerebral aqueduct, fourth ventricle -Describe the white matter of the brain, the commissural, association and projection fibers.
	<u><b>*Pathology:</b></u>	-Describe the Causes, Pathogenesis, Types, Effects & Complications of Hydrocephalus in Infants & Adults Define the Subfalcine (Cingulate), Transtentorial (Uncinate), & The Tonsillar Hernias & Describe the Effects of Each One