MED604: Block 4 | Course Objectives

**Approach to the Neurologic Patient**

04NPT001 Discuss the steps involved in the diagnosis of neurologic disease.

04NPT002 Describe how the neurologic exam correlates with CNS neuroanatomy.

04NPT003 Understand how imaging, electrophysiologic and psychologic tests supplement the neurologic exam.

**Higher Function**

04NHF001 Describe the neuroanatomy and physiology important in maintaining normal consciousness and the pathologic neuroanatomy of altered consciousness.

04NHF002 Describe the neuroanatomy and physiology of normal sleep and the behavior, arousability and EEG associated with major sleep stages.

04NHF003 Describe the genesis, electrophysiologic characteristics and neurotransmitter systems associated with partial and generalized seizures.

04NHF004 Describe the roles of the frontal lobes and limbic system on executive, decision-making functions and emotional expression and behavior.

04NHF005 Describe the anatomy, neurochemistry and physiology underlying learning/memory and reward/reinforcement behaviors.

04NHF006 Describe the role of the various regions of the cerebral cortex with an emphasis on dominant and non-dominant hemispheres on speech and language function and attention and recognition.

04NHF007 Describe the anatomical organization and function of the reticular formation-hypothalamus-autonomic nervous system axis and how stress alters normal function.

**Neural Cell Biology**

04NCB001 Describe the cellular and subcellular structure of the neuron.

04NCB002 Compare and contrast the main types of membrane potentials and their molecular basis.

04NCB003 Discuss mechanisms of synthesis, release, degradation, transport, re-uptake and resynthesis of cholinergic, monoaminergic, peptide, and amino acid neurotransmitters.

04NCB004 Describe the signaling mechanisms of the cholinergic, monoaminergic, peptide, and amino acid neurotransmitters.
04NCB005  Describe the structure and function of prototypic synapse and pharmacologic approaches to manipulation of synaptic function.

04NCB006  Describe neural system organization by neurotransmitter networks.

**Neural Development and Growth**

04NDG001  Describe the molecular, cellular and organizational mechanisms underlying growth and development of the nervous system, organs of special sense and craniofacial structures.

04NDG002  Describe the biochemistry, physiology and molecular biology of developmental abnormalities, responses to injury, regeneration/repair and plasticity of the nervous system.

04NDG003  Describe the physiologic and psychologic development of infancy and childhood.

04NDG004  Describe neuronal cellular and molecular changes in aging and how these changes influence behavior and the physiology of the aging brain.

04NDG005  Describe the effect of aging on the neurologic exam, cognition, personality and gait.

**Neural Environment**

04NEV001  Describe the arterial supply and venous drainage of the CNS.

04NEV002  Understand the structure and functions of the blood-brain barrier and the blood-CSF barrier.

04NEV003  Understand the physiological roles of the circumventricular organs.

04NEV004  Understand how cerebral blood flow is regulated and the factors that control cerebral metabolism and homeostasis.

04NEV005  Understand mechanisms of hypoxic/ischemic injury to the central nervous system.

04NEV006  Know the structural relationships of the dura mater, arachnoid and pia mater and the osteology of the cranial vault and vertebral column.

04NEV007  Understand the configuration and the anatomical relationships of the ventricular system of the brain and the subarachnoid space and its cisterns.

04NEV008  Understand the production, circulation and functions of CSF and the fluid volume/pressure relationships involved in intracranial pressure.

04NEV009  Describe the supporting cellular elements of the central and peripheral nervous systems.

04NEV010  Describe the function of myelin and the processes of myelination, and demyelination and remyelination.

04NEV011  Describe the essential aspects of the metabolic environment/support necessary for neuronal function.

04NEV012  Describe the role of mitochondrial enzymes in neuronal function.
04NEV013 Describe the role of nutritional factors in the development, maturation, maintenance and normal function of the nervous system.

04NEV014 Describe the mechanisms of action and potential toxic effects of agents used in the management of common CNS disorders.

**Primary Sensory and Motor Function**

04NSM001 Understand the relationship of segmentation of the spinal cord and spinal nerves to segmentation of the vertebral column and innervation of the cutaneous structures and muscle.

04NSM002 Understand the anatomical, neurochemical and functional organization (pathways and nuclear) of the central nervous system including the spinal cord, brainstem, diencephalon, cerebellum and cerebrum.

04NSM003 Understand the anatomical and functional organization of peripheral nervous system including the roots, nerves, ganglia and sensory receptors/organisms associated with the spinal cord, cranial nerves and autonomic nervous system.

04NSM004 Describe the anatomy and physiology of the olfactory, gustatory, auditory, vestibular and visual systems and their associated sensory organs and how common pathologies impact function.

04NSM005 Describe the central organization, peripheral distribution and neurochemistry of the sympathetic and parasympathetic divisions of the autonomic nervous system and the responses of innervated visceral effector organs.

04NSM006 Understand the peripheral receptors, afferent fiber types and origins, course and laterality, somatotopic organization, sites of termination and type(s) of information associated with the pathway components of the dorsal columns/medial lemniscal and spinothalamic systems.

04NSM007 Describe the categorization, physiology, psychology and endogenous and exogenous modulation of pain.

04NSM008 Describe the organization and roles of alpha and gamma motor neurons, how spinal reflexes and descending mechanisms influence their function to control movement and the consequences of lower motor neuron lesions.

04NSM009 Describe the cortical control of movement, the origins, course and laterality, somatotopic organization, sites of termination and type(s) of information associated with the pathway components of the major (corticospinal and corticobulbar) descending motor pathways and the consequences of upper motor neuron lesions.

04NSM010 Describe the anatomy, neurochemistry and function of the cerebellum, thalamus and basal ganglia and the signs and symptoms of their dysfunction.
**Biomedical Ethics**
04BME001 Demonstrate understanding of the ethical and legal standards that pertain to end-of-life care including: advance directives and decision-making capacity.
04BME002 Demonstrate understanding of the ethical and legal standards that pertain to euthanasia and assisted suicide.

**Communication Skills**
04COM001 Demonstrate the ability to communicate bad news to patients.
04COM002 Describe the process of bereavement and how the physician deals with this process in patients and their families.

**Gerontology**
04GER001 Describe the demography and epidemiology of aging in the US as it relates to: growth in numbers of older people; heterogeneity of the older population, including ethnically; societal aspects of aging; and health and health behaviors in the older population.
04GER002 Describe the changes associated with "normal" aging including: anatomic and physiologic changes; emotional, psychological and cognitive changes; functional changes; and sexual changes.
04GER003 Correlate physiologic changes with aging and susceptibility to diseases in older populations.
04GER004 Identify diseases and disorders that are more common in older people.
04GER005 Identify the prevalence of common psychological issues, such as depression, anxiety, suicide, and substance abuse in older people.
04GER006 Compare and contrast delirium, dementia, and depression in reference to older people.

**Human Development**
04HDE001 Identify the characteristics of a typical, healthy, active, productive elderly person.

**Inter-professional Care**
04IPC001 Identify aspects of the importance of the patient's family and community setting and of other health and community resources in management of stroke.

**Medical Care Across the Lifespan**
04MCL001 Describe the elements of comprehensive geriatric assessment.
04MCL002 Describe appropriate preventive services and immunizations for the older population.
04MCL003 Describe the principles of chronic disease management.
04MCL004 Identify the tools to assess functional status in the elderly.
04MCL005  Describe the concept and principles of chronic disease management.
04MCL006  Describe the principles of end-of-life care, and resources available for it.

Nutrition
04NUT001  Demonstrate the ability to assess nutritional status in older adults.
04NUT002  Describe that hallmarks of optimal nutrition for older adults.

Physical Examination
04PEX001  Demonstrate the ability to elicit a history of diseases of the neurologic system and special sense organs.
04PEX002  Apply knowledge of anatomy and physiology to explain normal and abnormal physical findings of: the neurological system; head and neck; and special sense organs.
04PEX003  Demonstrate the ability to perform the physical examination of the eyes and visual system.
04PEX004  Demonstrate the ability to perform the physical examination of the head, ears and auditory system, nose, throat and neck.
04PEX005  Demonstrate the ability to perform the physical examination of the nervous system.

Professionalism and Professional Identity Formation
04PIF001  Demonstrate the ability to engage in reflection about personal thoughts, feelings, and experiences related to death and dying.
04PIF002  Participate in discussion with experienced professionals about their experiences with death and dying.

Clinical Skills
04CKS001  Demonstrate understanding of the science of management of pain.

Patient Wrap-Up
PWU-SEI001  Observe and reflect on the patient’s experience with disease and the ways in which disease impacted the patient’s occupation, finances, and family.
PWU-SEI002  Observe and reflect on patient’s experience with the healthcare system.
PWU-SEI003  Observe and reflect on the coping skills used by the patient.
PWU-DPR001  Observe and evaluate the professional values exhibited by the physician.
PWU-DPR002  Observe and evaluate the communication skills of the physician.
PWU-DPR003  Observe and evaluate the patient-centeredness exhibited by the physician.
PWU-CSK001  Observe and evaluate the clinical reasoning skills exhibited by the physician.
PWU-CSK002  Apply basic science concepts to patient diagnoses and treatment.

**Patient-Centered Learning (PCL)**

PCL-CSK01  Demonstrate the ability to define and solve clinical problems based on a patient case.

PCL-CSK02  Demonstrate the ability to apply knowledge of basic sciences to clinical manifestations and presentation in a patient case.

PCL-CSK03  Demonstrate the ability to generate hypotheses based on the clinical presentation and underlying pathogenesis of disease in a patient case.

PCL-PTE01  Demonstrate the ability to actively listen to and reflect on information presented or discussed in learning objectives by other students.

PCL-PTE02  Demonstrate the ability to deliver concise, clear, scientifically-based presentations or discussions of learning objective topics.

PCL-PTE03  Demonstrate the ability to display knowledge of subject area in learning objective presentation that is beyond information covered in presentation or discussion.

PCL-PIF001  Demonstrate the ability to generate learning objectives based on deficiencies in the student's understanding of a patient case.

PCL-PIF002  Demonstrate the ability to gather evidence-based information from multiple resources that is relevant and sufficient to address learning issues generated from a patient case.

PCL-PIF003  Demonstrate responsibility to team through leadership and fulfillment of group duties.

PCL-PIF004  Demonstrate ability to assess learning needs, strengths, and limitations.

PCL-PIF005  Demonstrate ability to respond appropriately to feedback.

PCL-PIF006  Demonstrate ability to treat others in team with respect, show openness to different views, and discuss differences non-judgmentally.

PCL-PIF007  Demonstrate effort to continuously strive for excellence in all activities.