

LAST REVIEW: 2010-2011 **NEXT REVIEW:** 2015-2016 **STATUS:** A**COURSE TITLE:** Survey of Neurological Deficits**COMMON COURSE NUMBER:** PHT 2162**CREDIT HOURS:** 4**CONTACT HOUR BREAKDOWN****CLOCK HOURS:***(Voc. Course ONLY)*

Lecture: 64

Lab:

Clinic:

Other:

PREREQUISITE(S): PHT 1020 and PHT 2224**COREQUISITE(S):** PHT 2810L**PRE/COREQUISITE(S):****COURSE DESCRIPTION:**

Course introduces the etiology, pathophysiology and symptoms of common neurological diseases/conditions. Basic neuroanatomy is reviewed. Neurodiagnostic procedures are presented. Specific case study assignments of various neurological conditions are completed and discussed.

UNIT TITLES

- 1.0 Basic Neuroanatomy and Neurophysiology Review
- 2.0 Extrapyramidal and Pyramidal Tract Systems
- 3.0 Upper and Lower Motor Neurons
- 4.0 Cranial Nerves
- 5.0 Spinal Nerve and Neuropathies
- 6.0 Nerve Root Compression
- 7.0 The Sensory System
- 8.0 Neurodiagnostic Procedures
- 9.0 Miscellaneous Conditions
- 10.0 Reflex Integration
- 11.0 Normal Growth and Development
- 12.0 Pediatric Neurological Deficits
- 13.0 Neuromuscular Diseases
- 14.0 Traumatic Brain Injury
- 15.0 Cerebrovascular Accidents
- 16.0 Functional Significance of Spinal Cord Lesions
- 17.0 Parkinsonism
- 18.0 Multiple Sclerosis
- 19.0 Grand Rounds

ASSESSMENT:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.

- 1. Announced and unannounced quizzes and Unit examinations:**
- 2. Mid term and/or Final Exam (cumulative/comprehensive);**
- 3. Assessment of reading and online assignments via submission of homework projects;**
- 4. Participation in Discussion Forums on the e-learning site**
- 5. Completion of Case Study Reviews, Grand Rounds or other projects (group or individual) as assigned**

Common Course Number: PHT 2162

Unit 1 Basic Neuroanatomy and Neurophysiology Review

General Outcome:

- 1.0 The student will be able to discuss the components of the human nervous system and lesions affecting each component.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 1.1 State the basic components of the central and peripheral nervous systems.
- 1.2 Discuss the properties of the neuron including its component parts and how conduction occurs.
- 1.3 List the major divisions of the cerebrum, their functions, and lesion manifestations for each.
- 1.4 Describe the protective structures of the central nervous system including the meningeal fibers and cerebrospinal fluid.
- 1.5 Identify the components of the spinal cord with identification of the white versus gray matter.
- 1.6 Define hemispheric speciality including the description of laterality of brain function.
- 1.7 Differentiate between the various forms of epilepsy with identification of the key features of each.
- 1.8 Differentiate between anterior and posterior circulatory systems that supply specific areas of the brain.

Common Course Number: PHT 2162

Unit 2 Extrapyramidal and Pyramidal Tract Systems

General Outcome:

- 2.0 The student will be able to differentiate between the characteristics of motor system dysfunctions.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 2.1 Identify the major components of the motor system.
- 2.2 List the components of the reflex arc and how tone is mediated by its function.
- 2.3 Define the term tone.
- 2.4 Differentiate between voluntary and involuntary motor systems.
- 2.5 List characteristics of function for the extrapyramidal and pyramidal tract systems.
- 2.6 List characteristics of impairment of the extrapyramidal and pyramidal tract systems.
- 2.7 Identify the components of the basal ganglia.
- 2.8 List the major functions of the basal ganglia.
- 2.9 Describe impairments of the basal ganglia and the clinical significance of each.
- 2.10 Identify the primary functions of the cerebellum.
- 2.11 List the components of the brain stem and their functions.
- 2.12 Describe the characteristics of impairment of the cerebellum including the clinical significance of each.
- 2.13 List the major portions of the brain stem and the manifestations of lesions at each level.
- 2.14 List the basic tracts of the pyramidal system and the functions of each.

Common Course Number: PHT 2162

Unit 3 Upper and Lower Motor Neurons

General Outcome:

- 3.0 The student will be able to differentiate between the characteristics of motor system dysfunctions.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 3.1 Discuss the relationship between the upper motor neuron and the lower motor neuron with regard to movement control.
- 3.2 List upper motor neuron signs and symptoms.
- 3.3 List lower motor neuron signs and symptoms.
- 3.4 Differentiate between UMN vs LMN lesions in regards to their clinical manifestations.
- 3.5 Detail the abnormal reflexes evidenced in an UMN lesion including Babinski and Hoffman reflexes.
- 3.6 Define the terms spasticity, rigidity, and hyper/hypotonus.
- 3.7 Define fasciculations and fibrillations.
- 3.8 Understand the Modified Ashworth Scale as a means of reporting tone.
- 3.9 Describe how deep tendon reflexes are graded.

Common Course Number: PHT 2162

Unit 4 Cranial Nerves

General Outcome:

4.0 The student will be able to discuss the clinical significance of cranial nerve lesions.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 4.1 List the cranial nerves by name and in numerical order.
- 4.2 Identify which cranial nerves are purely motor, purely sensory or combined in function.
- 4.3 Describe the function of each cranial nerve.
- 4.4 Discuss the clinical significance of lesions at each cranial nerve.
- 4.5 Detail physical therapy treatments for common cranial nerve dysfunction syndromes.

Common Course Number: PHT 2162

Unit 5 Spinal Nerves and Neuropathies

General Outcome:

- 5.0 The student will be able to discuss the characteristics of segmental motor innervations and the clinical manifestations of peripheral nerve dysfunction.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 5.1 Identify major components of spinal nerves.
- 5.2 Detail the clinical manifestations of injury to a peripheral nerve.
- 5.3 Differentiate between neurapraxia, axontomesis and neurontomesis.
- 5.4 Define reaction of denervation including its clinical significance.
- 5.5 Discuss the process of Wallerian degeneration.
- 5.6 Discuss the general anatomy and primary divisions of the cervical nerves.
- 5.7 List the symptoms of upper cervical nerve lesions.
- 5.8 Label the main divisions of the brachial plexus.
- 5.9 Differentiate between an upper and a lower brachial plexus injury.
- 5.10 Recall the components that comprise the lumbosacral plexus.
- 5.11 Detail the motor and sensory innervations of each spinal nerve.
- 5.12 Discuss the clinical manifestations of injuries to each of the major spinal nerves.
- 5.13 List the characteristics of neuropathies with examples of same.
- 5.14 Describe the pathophysiology of Gullain Barre Syndrome (GBS).
- 5.15 List the clinical manifestations of GBS.
- 5.16 Identify specific PT goals and methods of treatment for neuropathies.

Common Course Number: PHT 2162

Unit 6 Nerve Root Compression

General Outcome:

- 6.0 The student will be able to relate mechanisms and characteristics of trauma as it occurs in the CNS.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 6.1 Describe the common neurological findings in compression trauma to spinal nerve roots.
6.2 Discuss the etiology and symptoms of cervical and lumbar disc herniations.
6.3 List the common clinical manifestations at each spinal level that occur when there is a compression on a nerve root.

Common Course Number: PHT 2162

Unit 7 The Sensory System

General Outcome:

7.0 The student will be able to understand and relate sensory system dysfunction.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 7.1 Identify the information/impulses carried by the sensory system.
- 7.2 List the various receptors responsible for sensation.
- 7.3 Discuss the abnormal signs/symptoms of sensory impairment.
- 7.4 Differentiate between the specialized muscle receptors (muscle spindle and Golgi tendon organ) in terms of their location and function.
- 7.5 List the tracts responsible for sensory integration including their specific locations and function.
- 7.6 Define the Romberg test.
- 7.7 Classify various type of pain that may be evidenced in the clinic.
- 7.8 Differentiate between the types of disturbances in sensation that may occur.
- 7.9 Discuss several clinical conditions in which sensory impairment is a significant feature and how this affects the delivery of physical therapy.

Common Course Number: PHT 2162

Unit 8 Neurodiagnostic Procedures

General Outcome:

8.0 The student will be able to discuss the purposes of selected diagnostic procedures.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 8.1 Identify major diagnostic procedures used to evaluate neurological symptoms.
- 8.2 Detail brief descriptions of how selected neurodiagnostics are utilized to confirm/deny diagnosis of a neurological condition.
- 8.3 Identify how diagnostic procedures clarify the condition for the clinician.
- 8.4 Differentiate between electrical activity/conduction studies, cerebrospinal fluid/spinal studies, cerebrovascular studies, anatomical imaging studies and physiological imaging techniques in terms of the procedures and their diagnostic purposes.

Common Course Number: PHT 2162

Unit 9 Miscellaneous Conditions

General Outcome:

- 9.0 The student will be able to describe typical features of miscellaneous conditions which affect the nervous system.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 9.1 Differentiate between primary and metastatic tumor growth.
- 9.2 Discuss the implications of neoplastic development in the nervous system.
- 9.3 Discuss the main function of physical therapy in treating patients with psychiatric disorders.
- 9.4 Differentiate acute vs chronic organic brain syndrome.
- 9.5 Define hysterical neurosis and relate its implications for clinical intervention.
- 9.6 Describe the mechanisms by which hydrocephalus may occur and its implications to the patient.
- 9.7 Discuss Down syndrome including its characteristics and the role of PT in its management.
- 9.8 Differentiate between the disorders senile and pre-senile dementia.
- 9.9 Relate the mechanism by which Alzheimer's disease occurs and the clinical manifestations of this disease.
- 9.10 Describe the pathophysiology of Pick's disease.
- 9.11 Describe the pathophysiology of Huntington's chorea and the role of PT in its management as the disease progresses.
- 9.12 Describe the clinical manifestations of Friedreich's Ataxia.
- 9.13 Define the mechanism of infectious disorders in the CNS relative to the development of pathological changes.
- 9.14 Discuss the etiology and clinical features of acute anterior poliomyelitis, viral encephalitis, meningitis, and Reyes syndrome.
- 9.15 Discuss the clinical significance of post-polio syndrome.

Common Course Number: PHT 2162

Unit 10 Reflex Integration

General Outcome:

10.0 The student will be able to understand reflex integration as it relates to normal development.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 10.1 Differentiate between the types of reflexes.
- 10.2 Discuss how reflex integration occurs.
- 10.3 Detail the major characteristics of the four levels of integration of the central nervous system, listing the response to stimulation at each level.
- 10.4 Differentiate between tonic vs. phasic reflexes.
- 10.5 List the specific reflexes that occur at each level of CNS maturation including a description and the response expected.
- 10.6 Relate the clinical significance of the reflexes in terms of when neuromuscular maturation and integration does not occur.

Common Course Number: PHT 2162

Unit 11 Normal Growth and Development

General Outcome:

11.0 The student will be able to relate neuromuscular maturation to child development.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 11.1 Discuss the concept of cephalocaudal development as it relates to neuromuscular maturation.
- 11.2 Detail the division of neuromuscular maturation by age groups up to the age of 12 months.
- 11.3 List the specific developmental milestones expected at each stage of neuromuscular maturation up to the age of 12 months.
- 11.4 Relate the level of neuromuscular maturation to the treatment approaches one may use in therapy.

Common Course Number: PHT 2162

Unit 12 Pediatric Neurological Deficits

General Outcome:

12.0 The student will be able to discuss common pediatric neurological deficits.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 12.1 Describe the general characteristics of autism.
- 12.2 Understand the difference between autism and Asperger's Syndrome.
- 12.3 Detail how therapeutic approaches may vary according to how a patient with autism presents clinically.
- 12.4 Discuss the implications of sensory defensiveness.
- 12.5 Define the term cerebral palsy (CP).
- 12.6 Differentiate between the clinical characteristics of cerebral palsy and other forms of CNS impairment.
- 12.7 Detail the etiology of the categories of cerebral palsies.
- 12.8 List the early/late signs and symptoms of CP.
- 12.9 Identify the major types of cerebral palsy including location of lesion, type of tone, etc.
- 12.10 Discuss the aims of treatment for cerebral palsy.
- 12.11 Relate developmental sequence to the treatment approaches for cerebral palsied patients.

Common Course Number: PHT 2162

Unit 13 Neuromuscular Diseases

General Outcome:

13.0 The student will be able to differentiate between a variety of neuromuscular diseases.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 13.1 Differentiate between muscular atrophies and muscular dystrophies.
- 13.2 List examples of neurogenic muscular atrophies.
- 13.3 Differentiate between infantile, chronic, juvenile and adult forms of spinal muscular atrophies.
- 13.4 Discuss the etiology and clinical manifestations of amyotrophic lateral sclerosis.
- 13.5 Differentiate between the various forms of muscular dystrophies including pseudohypertrophic, limb-girdle, and facio-scapulo-humeral.
- 13.6 Relate the clinical manifestations of the patient who has Duchenne's MD.
- 13.7 Detail the physical therapy program for Duchenne's MD.
- 13.8 Describe the therapeutic approach to the treatment of Duchenne's.
- 13.9 Differentiate between myotonia congenital and amyotonia congenita.
- 13.10 Discuss the disorder myasthenia gravis and its clinical implications.

Common Course Number: PHT 2162

Unit 14 Traumatic Brain Injury

General Outcome:

14.0 The student will be able to relate mechanisms and characteristics of traumatic brain injury.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 14.1 Describe the pathophysiology of brain injury including the mechanism of injury.
- 14.2 Differentiate between closed and open head injuries.
- 14.3 Discuss the clinical differences between concussion and contusion.
- 14.4 List the categories of hematomas that may develop as a result of head trauma.
- 14.5 Define coup/contrecoup.
- 14.6 Discuss the clinical significance of intracranial pressure.
- 14.7 Discuss the Glasgow Coma Scale and the Rancho Los Amigos Cognitive Scale in terms of their clinical significance.
- 14.8 Describe problem areas or complications of traumatic brain injury.
- 14.9 Indicate the stages of recovery following a traumatic brain injury.
- 14.10 List the common medications used to treat patients who have sustained a TBI.
- 14.11 List areas of concern/management during the acute stage of recovery from a TBI.
- 14.12 Describe the phases of rehabilitation of a coma patient including strategies for recovery.

Common Course Number: PHT 2162

Unit 15 Cerebrovascular Accidents

General Outcome:

15.0 The student will be able to relate mechanisms and characteristics of cerebrovascular disease.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 15.1 List the leading causes of cerebrovascular vascular accident including risk factors which are preventable and non-preventable.
- 15.2 Detail the pathophysiology of stroke.
- 15.3 Differentiate between the various categories of stroke and classifications of stroke as defined by the etiology.
- 15.4 Review the blood supply to the brain.
- 15.5 Discuss the medical management of a stroke patient.
- 15.6 Differentiate between a right and left hemiplegic patient in terms of clinical manifestations and behaviors.
- 15.7 Relate the clinical manifestations of stroke.
- 15.8 Define specific terms related to the stroke patient: aphasia, apraxia, synergy, dysarthria, agnosia, etc.
- 15.9 Discuss the role of physical therapy in the treatment of a stroke patient.
- 15.10 Detail current research in the treatment/prevention of CVA.

Common Course Number: PHT 2162

Unit 16 Functional Significance of Spinal Cord Lesions

General Outcome:

16.0 The student will be able to discuss aspects of injury and complication relative to spinal cord lesions.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 16.1 Discuss congenital spinal cord lesions with emphasis on spina bifida.
- 16.2 Differentiate between spina bifida occulta and spina bifida cystica.
- 16.3 Describe the therapeutic approach to the treatment of patients with spina bifida.
- 16.4 Discuss the mechanisms of injury to the spinal cord.
- 16.5 Differentiate between the various types of injury that can occur to the spinal cord.
- 16.6 Detail the acute care management of the SCI patient.
- 16.7 Discuss the clinical manifestations of spinal cord injury.
- 16.8 Differentiate between an upper versus a lower motor neuron bladder.
- 16.9 Describe a typical bowel management program for the SCI patient.
- 16.10 List the major complications for the SCI patient relative to organ systems.
- 16.11 Define an autonomic crisis and its implications.
- 16.12 Discuss the functional abilities for each level of spinal cord injury.
- 16.13 Describe specific wheelchair prescriptions for each SCI level.
- 16.14 List the key muscle increments that are added at each level of the spinal cord as it relates to increased functional abilities.

Common Course Number: PHT 2162

Unit 17 Parkinsonism

General Outcome:

17.0 The student will be able to discuss the clinical characteristics and management of Parkinsonism.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 17.1 Detail the pathophysiology of Parkinsonism.
- 17.2 Discuss the etiology of Parkinsonism.
- 17.3 List and discuss the clinical manifestations of Parkinsonism and the clinical significance of each.
- 17.4 Explain the possible secondary complications that can occur with Parkinson's Disease.
- 17.5 Discuss the medical management of Parkinsonism.
- 17.6 Detail the various types of surgical management of Parkinson's Disease.
- 17.7 Detail the physical therapy approach to the treatment of Parkinsonism.
- 17.8 Relate the stages of progression of Parkinson's Disease differentiating between the value of the Hoehn and Yahr scale versus the Unified Parkinson's Disease Rating Scale.
- 17.9 State the therapeutic goals in the rehabilitation of Parkinson's Disease.

Common Course Number: PHT 2162

Unit 18 Multiple Sclerosis

General Outcome:

18.0 The student will be able to discuss the clinical manifestations of multiple sclerosis.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 18.1 Detail the etiology of multiple sclerosis which includes multiple theories.
- 18.2 Discuss the pathophysiology of multiple sclerosis.
- 18.3 Define exacerbation and remission as they relate to multiple sclerosis.
- 18.4 List the major clinical manifestations of multiple sclerosis.
- 18.5 Differentiate between the types of multiple sclerosis.
- 18.6 Discuss how these manifestations affect the physical therapy management of patients with MS.
- 18.7 List secondary problems and complications of MS.
- 18.8 Relate the medical management of multiple sclerosis.
- 18.9 Detail long and short term goals relative to physical therapy.
- 18.10 Relate how prognosis is linked to the progression of the disease itself.

Common Course Number: PHT 2162**Unit 19 Grand Rounds*****General Outcome:***

19.0 The student will be able to apply knowledge regarding specific diseases/conditions to answer questions based on clinical case studies.

Specific Instructional Objectives:

Upon successful completion of this unit, the student will be able to:

- 19.1 Demonstrate basic awareness of how to conduct research on the Internet.
- 19.2 Explain, in own words, the pathophysiology of specific neurological diseases.
- 19.3 Explain, in own words, precautions that the PTA should take when performing interventions on individuals with specific neurological diseases/conditions.
- 19.4 Interpret information from a clinical case study to answer specific questions regarding the disease/condition.
- 19.5 Function as part of a group to discuss the pathophysiology, signs/symptoms and precautions related to a specific neurological disease/condition.