



**BAKER COLLEGE**  
**STUDENT LEARNING OUTCOMES**

**PTA 2150 Neurological Foundations of Motor Control**  
**2 Semester Hours**

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**Student Learning Outcomes & Enabling Objectives**

At the completion of this course, the student will be able to perform the following outcomes with a minimum achievement level of 77% (C+) or better:

1. Examine topics related to neuroanatomy and neurophysiology.
  - a. Describe the location and function of the major regions of the brain and spinal cord.
  - b. Distinguish between the central, peripheral and autonomic nervous system.
  - c. Describe the different types of neurons and glial cells based on structure and function.
  - d. Explain the pathway of the cerebrospinal fluid and its significance to the normal function of the central nervous system.
  - e. Identify the plexuses and major peripheral nerves detailing their primary motor and sensory functions.
  - f. Describe the primary arterial supply to the brain and spinal cord.
  - g. Explain the potential impact of vascular lesions in the nervous system.
  - h. Describe the location and function of the cranial nerves.
2. Describe the process of synaptic transmission and the role of neurotransmitters and neuromodulators.
  - a. Compare and contrast the different types of synaptic receptors and the primary neurotransmitters.
  - b. Explain the process of neuronal conduction as it relates to motor control in terms of reflexes, velocity and transmission.
  - c. Describe how pharmaceutical intervention affects the function of the nervous system.
3. Examine the somatosensory system in terms of receptors, innervation, and major pathways.
  - a. Identify the patterns of innervation of dermatomes vs. cutaneous distribution of the peripheral nerves.
  - b. Describe the various types of peripheral sensations and the sensory receptors.
  - c. Examine the major somatosensory pathways.
  - d. Explain the mechanisms of pain and how pain is perceived and modulated by the nervous system.
  - e. Compare and contrast the nervous system involvement in acute versus chronic pain states.
4. Explain normal muscle tone and voluntary movement in terms of major neural pathways and brain regions.

- a. Discuss muscle physiology in terms of fiber type, recruitment, and force production.
  - b. Examine the major motor pathways involved with movement.
  - c. Describe the feedback loop of the muscle spindle and golgi tendon organ in relation to reciprocal innervation and the stretch reflex.
5. Compare and contrast the major disorders of the motor system by region of injury.
- a. Explain the clinical manifestations of lesions to the central nervous system including:
    - i. Cerebral cortex
    - ii. Basal ganglia
    - iii. Cerebellum
    - iv. Spinal cord
  - b. Explain the clinical manifestations of degenerative movement disorders.
  - c. Examine the consequences of lesions within the peripheral nervous system.
  - d. Compare and contrast upper and lower motor neuron lesions and the associated clinical manifestations.
  - e. Explain neuronal injury and repair processes in the central and peripheral nervous systems.
6. Discuss the clinical implications of motor learning and motor control in physical therapy.
- a. Identify characteristics of different stages of motor learning.
  - b. Apply motor learning principles associated with motor performance, practice structure and feedback to therapeutic interventions.
  - c. Describe physiological mechanisms of neuroplasticity involved in motor learning and recovery of function.
7. Describe the role of the special senses (vision, hearing, vestibular) in motor control.

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These SLOs are not approved for experiential credit because this course is listed as a required basic science course with outcomes critical to accreditation requirements.

**Effective: Fall 2020**