



Neurologic Residency Program

Curriculum

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NEUROLOGIC RESIDENCY PROGRAM

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NeuroRTI's Neurologic Physical Therapy Residency is a 13-15 month program of post professional clinical and didactic education for physical therapists designed to advance the physical therapist resident's preparation as a provider of patient care services in neurologic physical therapy.

The program is a combination of didactic, collaborative and clinical education experiences using a combination of distance learning, on-line courses, virtual rounds and weekend intensive hands-on courses and clinical practice hours (including one-on-one mentor hours).

Program Objectives

- Grow as practitioners skilled in neurologic physical therapy.
- Become highly-skilled, autonomous practitioners who have substantially increased their ability to provide care to a full spectrum of patients with neurologic injuries or conditions.
- Gain a strong base of knowledge of evidence-based practice and preventative and rehabilitative neurologic therapy techniques.

Admission Requirements

1. All applicants must have successfully completed a CAPTE accredited professional physical therapy curriculum or have had a state physical therapy board approve the applicant's first postprofessional physical therapy program as "equivalent" to a US CAPTE accredited physical therapy program.
2. All applicants must provide a copy of a current and valid license to practice physical therapy in one of the 50 United States, Canada, the District of Columbia, Puerto Rico, or U.S. Virgin Islands. This license must be in good standing.
3. If English is not the applicant's native/first language, specified language proficiency requirements must be met.

Grading System (from Policy and Procedure Handbook Section 3.7)

Each online course will include voice over presentations or video, readings, discussion forums and most will contain a quiz. Successful completion of online content will be evaluated through grading of discussion forums and quizzes. Online content is available beginning at noon EST on the Friday prior to the Monday course start date.

Note that all course work is open book/open notes and that in the Anatomy course you will have 2 attempts at each quiz and will receive the higher of the 2 grades. After Anatomy, you will have 2 attempts at each quiz (not all courses have quizzes) and receive the average of the 2 grades.

The NeuroRTI system for grading quizzes and overall course grades is as follows-transcripts reflect a letter grade only:

Table 1: Grade Scale and Point equivalents

<u>Grade</u>	<u>GPA</u>	<u>Points</u>
A	4.00	92-100
A-	3.67	90-91
B+	3.33	88-89
B	3.00	83-87
B-	2.67	80-82
C+	2.33	77-79
C	2.00	73-76
C-	1.67	70-72
D+	1.33	67-69
D	1.00	63-66
D-	0.67	60-62
F	0.00	Below 60

WEEKLY DISCUSSION BOARD/FORUMS GRADING RUBRIC

Unless otherwise stated, discussions are graded on a pass/fail basis with passing being a 6 or above. Faculty will assign a passing grade when you have 6 points or greater as defined below. If you receive more than 1 failing grade in a course with more than 8 classroom hours, all but 1 forum must be remediated. Grading is based on the descriptions below:

- **9-10 points is** characterized by contributions that are prompt (**initial post no later than Thursday at 8 pm EST**), timely, self-initiated. There is no attempt to dominate conversation. The student expresses ideas clearly and concisely; demonstrates excellence in grasping key concepts and provides ample evidence of support for opinions. The postings readily provide new interpretations of discussion material. These posts have all of the characteristics of good posts/comments, but then goes further by adding one of the following: 1) stimulates the discussion in some way by raising a good question, raising new points to consider, etc., 2) demonstrates high level critical thinking, 3) pulls in key outside source material that speaks to the subject, 4) connects the subject to previous material taught in this course or in prior coursework. Required to reply to 2 or more classmate's posts by Friday, 9 EST.
- **6-8 points is** characterized by keeping up with the discussion generally (**initial post no later than Friday at 8 pm EST**) although there might be participation in some discussions more than others. Ideas are usually understood and show evidence of understanding most of the major concepts. Postings provide a basic level of support for opinions. The student offers an occasional divergent viewpoint. These posts are well written, and add to the discussion (eg agrees or disagrees with previous posts). Posts getting 6 points needs to show increased level of synthesis and reflection, as well as support for the position taken. 7-8 point posts demonstrate reflection, and positions are articulated with good support. **Required to reply to 2 classmate's posts by Sunday, 9 EST.**
- **5-3 points is** characterized by participation that is not timely and spotty; picks and chooses topics to get involved in; offers short, perfunctory postings. Posting may show shallow grasp of the material and/or offer inadequate levels of support for opinions. The student rarely takes a stand on issues. The post shows effort to say something relevant,

but does not add anything substantial to the discussion. Initial post is made Saturday or later and replies are after 9 on Sunday.

- **2 or 1 points** are characterized by infrequent to rare participation with short and/or irrelevant remarks. The student shows no significant understanding of material. The post is irrelevant and adds nothing to the discussion.
- **0 point posts** - No post made. Or, the post is not considered to be a contribution that can be graded. An example is a response that is appropriate, but is more social in nature.

Successful completion in a course is an overall grade of B- or higher. Rules on remediation due to illness, etc. can be found in Section 2.6 of the P&P Handbook.

Onsite lab work will be evaluated utilizing the WI Skills Checklist provided to students at least 2 weeks prior to the onsite lab. WI skills checklist requires an 80% or better as scored on the checklist.

Curriculum

- Evidence-based Practice
- Applied Neuro Anatomy
- Neurological Imaging
- Pharmacology for the Neuro Patient
- Medical Screening for the Neuro Patient

Diagnosis Specific

- Acquired Brain Injury
- Spinal Cord Dysfunction
- Other Disorders

Neurologic Rehab Interventions

- Advanced Gait Assessment & Orthotics *
- Motor Learning/Motor Control & Neuroplasticity *
- Manual Therapy Interventions for the Neuro Patient *
- Wheelchair Seating and Positioning *
- Electrical Stimulation *

- Topics in NeuroRehabilitation (Spasticity Mgmt. and Outcome Measures)
- Advanced Topics in Neurological Rehab (Neuropsychology, Integumentary Repair, and Respiratory)
- Locomotor Training and Robotics
- Administrative Topics (Documentation, Ethics, Clinical Education/Research)
- Motor Development/Pediatrics
- Health Promotion/Aging

- Mentored Clinical Practice
- Neurologic Virtual Rounds
- NCS Prep Course

****Part of a 2-day hands-on lab***

EBP 6100 Evidence -based Practice

The purpose of this course is to improve the participant's understanding and use of evidence-based practice, to include the ability to ask clinically relevant questions, find and interpret the evidence, and apply this evidence to clinical practice using an EBP approach. Ultimately, the goal of this course is to develop consumers and users of clinical research that will improve the quality and impact of the participant's clinical practice on the patients they serve. This course is entirely self-paced and online.

Course Objectives

- Define EBP and discuss its philosophy and fundamental principles.
- Construct unstructured clinical questions as well as well-built clinical questions.
- Search the literature using available search portals, engines and databases effectively and efficiently.
- Critically appraise articles dealing with Intervention or Therapy for validity.
- Discuss the application of current best evidence into clinical practice using an EBP approach.
- Discuss evaluation of your performance.
- Identify key EBP resources and aides.

Course Outline

Module	Topic
1.	Getting to know EBP
2.	Asking clinical questions
3.	Tracking down the evidence
4.	Critical appraisal
5.	Applying the EBP model
6.	Appraising your performance
7.	Closing thoughts on EBP and quiz

NRTI 6310 Applied Neuroanatomy

Neuroanatomy is a basic science course that comes to life for the practicing physical therapist when the relevance of nervous system's structure and function are brought to light. This course is designed to provide a comprehensive review of neuroanatomy while at the same time highlighting current neuroscientific findings that are relevant to clinical practice. Emphasis will be placed on production of voluntary and involuntary movement, the brain structures and pathways that are implicated in movement production, and neurologic disorders of movement. These motor systems will be explained in a manner to enable the clinician to better interpret clinical findings and responses to interventions. In addition, current theories of neuroplasticity will be pointed out as we explore specific regions of the CNS, including the motor cortex, basal ganglia, and cerebellum. The goal is that each of you leaves the course better able to make decisions and draw conclusions regarding your clients with neurologic disorders.

Course Objectives

- Define basic terminology associated with neuroanatomy;

- Identify specific areas and structures associated with the surface anatomy and internal anatomy of the brain, spinal cord, and peripheral nervous system;
- Explain fundamental concepts of neurophysiology at the cellular level including: structure of the neuron, function of the synapse, action potentials and their transmission
- Describe major functions of the central nervous system including the lobes of the cortex, subcortical cerebral structures, brainstem, cerebellum, and spinal cord, and explain the interdependence of these areas for normal neurologic function.
- Analyze neurologic cases and determine likely causes of a patient's signs and symptoms.
- Describe the major motor control neural circuitry and apply current motor control theories in order to examine the production of normal movement, and potential sources of abnormal movement.

Course Outline

Module	Topic
1.	Introduction to Neuroanatomy & Cellular Physiology of Nervous System
2.	Spinal Cord and Major White Matter Pathways
3.	The Cerebrum – Cortex, Diencephalon, Support Systems
4.	Higher order Cerebral Cortex Function
5.	Basal Ganglia and Cerebellum
6.	Brainstem and Cranial Nerves
7.	Vestibular and Visual Systems
8.	Motor Control Theory and Neuroanatomy

NRTI 6119 and 6119WI: Motor Learning/Motor Control

This course will expose students to the theoretical perspectives and current principles associated with the control and learning of movement skills. Specifically, the neural and mechanical mechanisms underlying motor behavior and the variables influencing motor learning will be addressed. Throughout the course, application of theoretical concepts to instructional and clinical settings will be emphasized.

Course Objectives (Online)

- Understand the general classification of motor skills.
- Realize that performing voluntary coordinated movement requires motor control and attention.
- Be more familiar with the theories that attempt to explain how movement skills are controlled and learned.
- Understand the various measurement techniques used to examine motor performance and distinguish temporary changes in performance from the relatively permanent changes that accompany learning.
- Understand and identify the variables that influence the learning of movement skills.

Onsite Objectives

- Become familiar with the techniques and strategies a practitioner and or clinician can employ to enhance learning and subsequent retention of movement skills.
- Application of theoretical concepts to instructional and clinical settings will be emphasized.

NRTI 6129 and 6129WI: Advanced Pathologic Gait Assessment & Orthotics

Course Description-Advanced Pathological Gait Assessment

Orthoses are often an important adjunct to the rehabilitation modalities employed in the management of patients with lower extremity weakness or deformity. An understanding of normal and abnormal gait biomechanics is paramount to prescribing of lower extremity orthoses. This course provides a study of abnormal gait *from an orthotists perspective*. This course builds on the assumption that students have a working knowledge of the biomechanics of normal human locomotion.

Understanding the impact of the ground reaction force on the moments generated around the joints of the lower extremity in normal and pathological gait is imperative for understanding the design criteria for prescribing orthoses. This course will teach students to break down and analyze pathological gait into its component parts and then use that information to prescribe lower extremity orthoses.

Course Objectives

- Describe the impact of the ground reaction force on the moments around the ankle, knee and hip joints during each portion of stance phase in normal and pathological gait.
- Understand the role the moments around the joints play in determining orthotic design.
- Understand and employ the principles of *Perry's Observational Gait Analysis* and Elaine Owens '*Segmental Kinematic Approach to Orthotic Management*.
- Describe the prescription criteria associated with the appropriate selection and design of lower extremity orthoses.

Course Description-Lower Extremity Orthotic Management of Neuromuscular Disorders

This course builds upon the Advanced Pathological Gait Assessment course and delves into the specifics of the orthotic management of common neuromuscular disorders. Disorders that will be covered include: CVA, Post-Polio Syndrome (PPS), Cerebral Palsy, Spina Bifida and Muscular Dystrophy. Specific orthosis and footwear combination designs will be discussed. Indications, contraindications, primary and secondary effects of these orthoses will be considered and examined. Video case presentations will be studied to demonstrate the impact of various orthotic interventions.

Course Objectives

- Differentiate between various lower extremity orthoses.
- Describe the indications and contraindications for several different lower extremity orthoses.
- Describe the ankle control mechanisms of lower extremity orthoses and which muscle compartment's function each one replaces.

- Explain the prescription criteria used to make decisions regarding lower extremity orthoses for patients with neuromuscular disorders.
- Appropriately prescribe lower extremity orthoses for individuals presenting with neuromuscular disorders.

NRTI 6129 WI-Advanced Pathologic Gait Assessment & Orthotics (Onsite)

Lower Limb Orthotic Management: Case Studies

This course consists of a live study of gait pathomechanics and the use of orthoses to manage these pathomechanics. Real patients from the area who wear orthoses for improved gait efficiency will attend. Students will have the opportunity to perform gait assessments, discuss possible orthotic solutions and determine an appropriate orthotic prescription. Various orthotic options will be considered and discussed. The patients' orthotic design will be discussed and evaluated. Students will then assess the patients' gait with their orthoses on and evaluate the orthotic outcome. Orthotic outcomes will be discussed and analyzed as a group. Common lower extremity orthotic problems and solutions will also be discussed and a variety of lower extremity orthoses will be available for hands-on learning.

Course Objectives

- Conduct a gait analysis of patients with neuromuscular disorders
- Analyze the gait pathomechanics of patients with neuromuscular disorders and discuss how these pathomechanics can be addressed with orthoses
- Prescribe appropriate orthotic management for patients with neuromuscular disorders and provide rationale for your prescription
- Define reasonable outcomes for orthotic management of patients with neuromuscular disorders
- Effectively assess whether the expected outcome has been achieved

NRTI 6110 Acquired Brain Injury

Acquired brain injury includes content areas of stroke, traumatic brain injury, non-traumatic brain injury, and cerebral palsy. This four-week course is designed to review the complexity and plasticity of the brain following injury in relation to the practice of physical therapy. Functional review of anatomy and imaging related to clinical presentation will be reviewed as well as development of examination techniques and plan of care utilizing current evidence and best practice related to the acquired brain injury population. In addition, we will have 2 virtual rounds to highlight case examples in these populations for collaborative discussion related to the physical therapy management of these complex cases.

Course Objectives

- Correlate neuroanatomical injury with presentation in acquired brain injury
- Complete thorough physical therapy examination and evaluation of a patient with acquired brain injury
- Develop a comprehensive treatment plan for a patient with acquired brain injury
- Identify appropriate outcome measures to utilize with acquired brain injury population

- Utilize current evidence to explain factors affecting prognosis in the acquired brain injury population

Course Outline

Module	Topic
1.	Stroke
2.	Cerebral Palsy
3.	Traumatic Brain Injury
4.	Non-traumatic Brain Injury

NRTI 6120 Other Neurologic Disorders

Post-Polio Syndrome and Guillain-Barré Syndrome

This course will enhance the resident's understanding of the pathophysiology of poliomyelitis, post-polio syndrome (PPS), and Guillain-Barré Syndrome (GBS)/Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP). Optimal outcomes can only occur with comprehensive examination, evaluation, and diagnosis, leading to appropriate goals, plan of care, and interventions. Aspects of patient/client management that are unique to these patient populations will be emphasized in this course. Objectives will be met through on-line lecture, reading assignments, and discussion of patient cases.

Course Objectives

- Discuss the clinical physical presentations of patients/clients presenting with PPS and GBS/AIDP.
- Compare prognoses and goals of patients/clients presenting with PPS and GBS/AIDP.
- Discuss potential causes of pain and interventions for pain management.
- Discuss how various types of durable medical equipment and/or orthoses can improve function, participation, and quality of life.
- Integrate knowledge of benefits of physical activity with that of exercise and energy conservation.
- Determine needed referrals to other health care providers when issues fall beyond the scope of physical therapist practice.

Vestibular Dysfunction

This course will provide the participant with the opportunity to: integrate the normal anatomy and physiology of the vestibular system with the pathophysiology of common vestibular disorders with the knowledge of examination, evaluation, diagnosis, prognosis, intervention, and outcomes to achieve a problem-solving approach that will enhance clinical decision-making skills for the management of a patient with a common vestibular disorder. This course will be online with a virtual round webinar.

Course Objectives

- Explain in lay terms the anatomy and physiology of the vestibular system
- Describe the hallmark presentations of various vestibular disorders

- Perform an initial examination on a patient with suspected vestibular dysfunction and give rationale for appropriate examination measures
- Gather examination findings and diagnose patients with central or peripheral vestibular dysfunction by accurate interpretation of findings
- Recognize and state the clinical significance of diagnostic studies and lab data
- Formulate, select, and give rationale for plan of care that includes therapeutic regimens
- Utilize appropriate outcome measures based on ICF model for patients with vestibular dysfunction
- Recommend appropriate referral sources and discharge planning

Course Outline

Modules	Topic
1.	Anatomy and Physiology of the Vestibular System
2.	Peripheral and Central Vestibular Disorders
3.	Examination of Patients with Vestibular Dysfunction
4.	Interventions for Patients with Vestibular Dysfunction
5.	Outcome Measures in Vestibular Rehabilitation

Care of the Amputee

This course presents information for those who provide care for people with amputations. The course focuses on the activities a person with an amputation performs without a prosthesis (artificial limb), the basic components of a prosthesis for upper and lower limbs, and the basic training for use of the prosthesis. Information about causes and prevention of amputations, training for self-care activities, and basic exercise programs for upper and lower limb amputations is also reviewed.

Course Objectives

- Understand the causes and prevention of amputations in adults.
- Explain the principles for management of an amputation.
- Understand the functional activities involved for a person without a prosthesis.
- Identify the basic information about upper and lower limb prosthetics.
- Explain the training involved with the use of lower limb prosthesis.
- Identify the causes and treatments of a child with an amputation.

Neurologic Progressive Disorders (ALS, Multiple Sclerosis, Parkinson's)

The purpose of this course is to explore the current evidenced based literature regarding Parkinson's Disease, Multiple Sclerosis and ALS. Newer theories on etiology of each disorder will be investigated, as well as pathological findings. Special evidenced based topics for each diagnosis will be considered including, early treatment efficacy, neuroprotective effects of

exercise, neuroplasticity in progressive disorders, effects of fatigue and heat on exercise, exercise efficacy for differing levels of each condition, and end of life issues.

Course Objectives

- Define medical and surgical considerations for Parkinson’s, MS and ALS
- Understand special EBP treatment considerations for Parkinson’s, MS and ALS

Course Outline

Modules	Topic
1	Neurodegenerative Diseases: Some Facts You May Know and Some You May Not
2	Special EBP Treatment Considerations for Parkinson’s Early treatment efficacy Neuroprotective effects of exercise Parkinson’s fatigue
3	Special EBP Treatment Considerations for MS Exercise efficacy for all stages New literature on fatigue Effects of heat Neuroprotective effects of exercise and neuroplasticity
4	Special EBP Treatment Considerations for ALS, “Rehabilitation in Reverse” End of Life Issues

Peripheral Nerve Injury

This course will expand the resident’s understanding of peripheral nerve injuries. Classification systems of PNS injuries will be reviewed. The most common peripheral neuropathies will be categorized, and compared. Prognosis and goals of clients with various neuropathies will be explored. Also, the peripheral nervous system changes associated with aging will be described including necessary modifications to treatment. Objectives will be met through on-line lecture, reading assignments and discussion of patient cases.

Course Objectives

- Compare and contrast different PNS injury classification schemes.
- Identify and categorize different neuropathies into the appropriate groups:
 - Hereditary neuropathies
 - Compression and entrapment neuropathies
 - Neurotmesis
 - Metabolic neuropathies
 - Infectious neuropathies
 - Toxic neuropathies
- For each neuropathy category, compare and contrast the clinical presentation of clients.
- For each neuropathy category, compare and contrast the prognosis and goals of the clients.
- Explore peripheral nervous systems changes with aging, and modify treatment in response to these changes.

NRTI 6210: Spinal Cord Dysfunction

Neurogenic Bowel & Bladder

This purpose of this course is to enhance the participant's understanding in the care of patients with bowel or bladder control issues secondary to neurological disorders &/or impairments. Participants will gain knowledge of the basic anatomy, etiology, clinical findings and nursing, medical and surgical management options for those with neurogenic bowel & bladder. This online course is self-paced.

Course Objectives

- Be able to discuss basic anatomy of urinary system & how it can be affected in those with neurological disorders &/or impairments (UMN & LMN).
- Describe current clinical practices, techniques, & products available on the market to help manage neurogenic bladder.
- Be able to discuss basic anatomy of the digestive system & how it can be affected neurologically.
- Differentiate between upper motor neuron & lower motor neuron neurogenic bowel, as well as potential complications associated with bowel elimination.
- Describe current best practices regarding how to perform a bowel program, for both UMN & LMN.
- Identify age related considerations (pediatric, adult, geriatric) when attempting to help manage neurogenic bowel & bladder.

Course Outline

Module	Topic
1.	Basic Anatomy & Physiology of the Urinary System
2.	Neurogenic Bladder: UMN vs LMN
3.	Techniques for Managing Neurogenic Bladder & Urinary Incontinence
4.	Basic Anatomy of the Digestive System
5.	Neurogenic Bowel: UMN vs LMN
6.	Proper Neurogenic Bowel Management
7.	Age Related Considerations
8.	Quiz

Medical Ventilator Management

The purpose of this course is to improve the participant's understanding and use of mechanical ventilators and understand the medical management with dealing with mechanical ventilators. This will include the ability to ask clinically relevant questions, find and interpret the evidence, and apply the information to clinical practice. Ultimately, the goal of this course is to expand knowledge for consumers and users of mechanical ventilators which will improve the quality and impact of the participant's clinical practice on the patients they serve. This course is entirely self-paced and online.

Course Objectives

- An understanding of the ventilator settings ordered by physician.

- An understanding of reasoning and action required when ventilator alarms.
- Knowledge of weaning techniques and action required for therapy.

Course Outline

Module	Topic
1.	Getting to know mechanical ventilators
2.	Understanding ventilator alarms and actions
3.	Understanding weaning techniques of mechanical ventilators

Spinal Cord Dysfunction: Advanced Transfer Training

The purpose of this course is to improve the participant’s understanding of advanced transfers with respect to a given level of injury. For the purpose of this course, advanced transfers will be defined as transfers above the “expected” level of function for a given level of injury. Participants will be expected to understand specific techniques related to high level mobility skills as well as biomechanical aspects that affect high level mobility with spinal cord injury. This course will combine literature and video review, group discussion and case studies.

Course Objectives

- Define “Advanced Transfers” and implication for life with spinal cord injury.
- Identify variables that lead to success in the realm of advanced transfers/mobility
- Search the literature using available search portals, engines and databases effectively to define areas of concern related to advanced transfers/mobility.
- Discuss the current best clinical practice related to advanced transfers/mobility
- Discuss case studies and expectations related to level of injury and risk vs. benefit

Course Outline

Modules	Topic
1.	Initial outline of Advanced Mobility concepts
2.	Literature Review of advanced transfer research
3.	Video Presentation of SCI survivors
4.	Case study and or quiz
5.	Closing thoughts on Advanced Transfer mobility

Upper Extremity Management of Spinal Cord Injury

Persons with spinal cord injury (SCI) receive therapy services in inpatient and outpatient facilities which specialize in neurologic rehabilitation. The goals of this course are to provide a comprehensive approach for assessing upper-extremity impairment and function after SCI and present a framework for selecting and tailoring interventions. The course will include a review of common upper-extremity impairments following SCI and clinical assessment

strategies. Rehabilitation today, focuses not only on improvement of function and participation in activities of daily living, but also on interventions, decision-making and patient education that will facilitate the recovery of upper-extremity function. The instructor will challenge the students to integrate assessment data with various intervention strategies in order to optimize the provision of upper-extremity SCI rehabilitation services based on patient-centered goals.

Course Objectives

- Describe the neural mechanisms underlying spinal cord injury induced upper-extremity impairments and the contribution of the various impairments to loss of function.
- Describe methods to assess upper-extremity impairments and function post SCI.
- Discuss splinting and positioning to preserve function and optimize recovery.
- Discuss the current evidence related to upper extremity recovery.
- Discuss how results from assessments at various levels of measurement are used to make informed clinical decisions regarding goal setting, selection of interventions, and continuation of services.

International Standards for Neurological Classification of SCI

The American Spinal Injury Association (ASIA) establishes and promotes standards of excellence for all aspects of health care of individuals with spinal cord injury from onset throughout life. One of ASIA's primary missions is to inform and teach our members and other healthcare professionals about spinal cord injury. The International Standards Training e-Learning Program, or InSTeP, is a six-module course designed to enable clinicians to perform accurate and consistent neurological examinations of individuals with spinal cord injury.

Course Objectives

- Apply a working knowledge of the bony and neurologic structures of the spine and spinal cord for during the performance of the examination.
- Perform an accurate sensory and motor examination, avoiding common "pitfalls".
 - a. Provide clear and standardized instructions to the patient for sensory and motor testing.
 - b. Demonstrate a working knowledge of the key dermatomes and myotomes used in the International standards
 - c. Differentiate between general muscle testing and the techniques used in the international Standards
- Accurately record examination findings on the ISNCSCI Examination Sheet-including special circumstances and when testing is not possible.
- Use the Scoring section of the ISNCSCI Worksheet to
 - a. Define the neurological, sensory and motor levels of injury
 - b. Define the ASIA Impairment Scale (AIS) Classification
 - c. Define the Zone of Partial Preservation
- Understand and optional testing, but recommended aspects of the neurological exam for patients with spinal cord injury.

NRTI 7170: Virtual Rounds and Case Presentations

Within the Upper Extremity Management Course (NR 305D), Acquired Brain Injury (NR 306) and Advanced Transfer Training (NR 305C) courses, there will be live case study discussions with faculty related to the course description and objectives. These sessions will be offered on a Tuesday or Thursday evening and are recorded for those students who cannot attend. Students who do not participate in the live session will be required listen to the recording and write a half page summary of the discussion and submit by Sunday following the VR.

Course Objective

For practical application of concepts learned in the online course and to assess and discuss clinical decision-making processes including but not limited to assessment and intervention strategies to maximize patient outcomes.

NRTI 6130 Topics in Neurological Rehabilitation

Outcome Measurement/Assessment Tools During Treatment

The purpose of this course is to equip participants with the skills and resources necessary to effectively utilize standardized outcome measures (OMs) in clinical practice. Participants will learn to critically evaluate and select appropriate OMs for patients with neurological diagnoses who are being seen in various care settings by comparing psychometric properties and clinical utility data. Online resources will be introduced to enable participants to construct effective searches for appropriate OMs. Course topics will include discussions of barriers and facilitators to clinical use of OMs and the development of strategies to foster routine clinical use of OMs.

Course Objectives

- Describe the characteristics of standardized outcome measures.
- Discuss the rationale for incorporating standardized outcome measures into clinical practice.
- Discuss the barriers and facilitators to routine use of standardized outcome measures.
- Discuss strategies for increasing the use of standardized outcome measures.
- Demonstrate an understanding of psychometric properties used to examine standardized outcome measures (e.g. reliability, validity, floor/ceiling effects, responsiveness, minimal clinical important difference, minimal detectable change, sensitivity/specificity, likelihood ratios, etc.).
- Evaluate the clinical utility of standardized outcome measures.
- Demonstrate the ability to effectively utilize available online resources to locate information on standardized outcome measures.
- Differentiate appropriate standardized outcome measures for different practice settings.
- Apply standardized measurement tools and make reasonable adaptations for non-standardized situations.
- Interpret the results of standardized outcome measures and discuss the implications for goal setting and development of a plan of care.

Spasticity Assessment and Treatment

The purpose of this 4-hour course is to improve the participant's understanding of spasticity as part of the upper motor neuron syndrome, including the basic pathophysiology, assessment methods, and treatment options.

Course Objectives

- Identify and differentiate types of muscle overactivity that are commonly referred to as "spasticity" and recognize their clinical presentations
- Discuss the potential pathophysiology's and origins of spasticity
- Identify and differentiate various assessment tools used in assessing spasticity and when each of these tools may or may not be appropriate
- Identify and discuss at least three different activity-based or participation-based outcome measures to utilize in the functional assessment of patients with various levels of spasticity.
- Discuss at least 3 different options for medical management of spasticity and give benefits and potential side effects for each of these options.
- Discuss at least 3 different therapeutic treatment options for patients with spasticity

Course Outline

Module	Topic
1.	Pathophysiology of Spasticity and the Upper Motor Neuron Syndrome
2.	Assessment of Spasticity
3.	Assessment of Spasticity, cont.; Medical treatment options
4.	Therapeutic treatment options

NRTI 6139 and 6139WI Manual Therapy Interventions for Neurologic Patients

The purpose of this course is to improve the participant's understanding of the musculoskeletal systems role in the primary neurologically involved client. This course will focus on evaluation and intervention strategies designed to improve function and decrease pain in the upper and lower extremity of patients with neurological disorders. Ultimately, the goal of this course is to develop a high level of competency in management of the musculoskeletal system in this patient population.

Course Objectives

Objectives for Neurologic Shoulder in CVA and SCI

- Describe the anatomy of the shoulder, scapular alignment, and mobility
- Describe the research specific to glenohumeral stability
- Describe the basic principles of the post-stroke and chronic SCI shoulder

- Effectively & appropriately perform taping techniques to support and facilitate recovery
- Demonstrate appropriate understanding of the use of FES for sensory and motor recovery
- Demonstrate proper positioning techniques for the upper extremity
- Identify and implement other supportive devices
- Design a home exercise program and how to incorporate functional training into a therapy session
- Perform with moderate proficiency manual therapy (mobilization/manipulation) to the thoracic spine and scapula thoracic region
- Apply techniques learned to patients demonstrating neurologic shoulder dysfunction.

Objectives for Common Musculoskeletal Injuries associated with Gait Deficits in the Neurologic Population

- Describe normal gait mechanics
- Identify gait abnormalities and compensatory strategies in a patient post-neurologic insult
- Identify common musculoskeletal complaints based off gait abnormalities
- Describe the role of assistive devices and orthotics in altered gait mechanics
- Perform neuromuscular, manual therapy (mobilization/manipulation) techniques, and exercise to common musculoskeletal dysfunction
- Apply techniques learned to the neurologic patient with demonstrated gait deficits.

NRTI 6140: Advanced Topics in Neurological Rehab

Psychology and Neuropsychology

As healthcare professionals, physical therapists must be in tune with the psychological needs of the patients we serve. Patients often bring prior psychological diagnosis to the rehabilitation center and must also deal with coping and adjusting to a new neurologic diagnosis/traumatic event. Patient behavior and participation are further complicated by the physiologic and neuropsychological sequelae of injury and disease. This course will expose the participant to psychological and neuropsychological considerations in the management of patients with neurologic injury and illness.

Course Objectives

- Be able to describe expected emotional and behavioral responses to illness and recovery.
- Describe the impact of personality and prior psychological conditions on recovery.
- Describe the potential impact of neurological trauma or disease on memory, attention, executive function, and perception.
- Describe the impact of neurologic injury or disease on caregiver relationships.

Tissue Trauma and healing/Integumentary Repair and Protection

The purpose of this course is to provide an introduction to the integumentary system, methods of healing, and modalities frequently used by physical therapists to facilitate healing. Additionally, this course will review the literature in wound care and interventions that will decrease tissue trauma in the neurologic patient; as well as, other patient populations.

Course Objectives

- Discuss the anatomy of the skin and physiology of healing
- Identify treatment modalities in wound care, i.e. dressings, positioning, modalities, and pressure redistribution.
- Incorporate an integumentary care plan for a patient with a wound to facilitate a multi-disciplinary healing strategy by using the lecture material, literature, and your own experience

Breathing and Postural Control/Respiratory

This course will challenge therapists to make a paradigm shift and acknowledge the entire trunk as an integral component of normal postural control and movement strategies from the vocal folds on top, to the diaphragm in the middle, to the pelvic floor on the bottom. Through the use of a “soda pop can” model and novel research, the instructor will demonstrate how every muscle of the trunk has a simultaneous role in postural control and respiration. These muscles finely regulate intra-thoracic and intra-abdominal pressures to meet the constantly fluctuating demands of postural control, respiration, and internal organ function. This concept provides the cornerstone for the instructor’s multi-system approach to evaluating and treating movement dysfunction. Through clinical cases, breathing assessment and retraining skills that can immediately be incorporated into clinical practice will be demonstrated. Additional patient cases will be presented throughout the course to reinforce theoretical concepts and will be

discussed in the online discussion forums. This course is utilizing recorded presentations, along with weekly assignments and discussion board.

Course Objectives

- State how the mechanics of breathing and postural control are interactive and inter-dependent components of normal movement strategies
- State how the vocal folds, diaphragm, and pelvic floor are related to each other for breathing, postural control, upper and lower extremity function as well their relationship to their roles in talking, breathing and continence.
- Describe multiple, simultaneous roles of the diaphragm as related to breathing, postural control, gastroesophageal reflex, constipation, and venous return.
- Integrate the pulmonary system into a multi-system physical and physiologic evaluation approach to motor impairments from a wide range of conditions such as shoulder injuries, chronic pain, limited endurance, balance impairments, etc.
- Apply theoretical concepts to multiple clinical cases
- Demonstrate the ability to visually assess breathing patterns for patients in a variety of postures.
- Demonstrate the ability to change breathing patterns with optimal positioning, ventilatory strategies, and manual techniques and state when it would be appropriate for your caseload.

Course Outline

Module	Topic
1.	Breathing and Postural Control: A Multisystem Event Part A
2.	What you can do in 90-seconds or less that has a profound and lasting effect
3.	Overview of Movement Strategies: Effectively Integrating the Neuromuscular, Musculoskeletal, Respiratory and Sensory Systems

NRTI 6220 Medical Screening for the Neurologic PT

Though neurologic physical therapists most often examine and treat patients with a primary neurologic diagnosis, often these patients have co-morbidities and/or risk factors that require additional screening skills. The primary goal of this course is to prepare you to recognize client problems that are beyond the expertise of a physical therapist, and to then make the appropriate decision regarding the next step – from a referral back to the physician to calling 911. This level of differential diagnosis requires you to effectively compare and contrast neuromuscular signs and symptoms with those of possible systemic origin. We will review the clinical manifestations of the more common systemic disorders and discuss how they might mimic dysfunction of the neuromuscular system. We will also highlight emergency situations that require immediate medical intervention. You will develop proficiency in: systems screening, differential interviewing strategies, risk factors and red flag recognition. Pattern recognition and algorithmic approaches to clinical problem solving will be presented and practiced using case presentations.

Course Objectives

- Recognize, identify, and analyze signs, symptoms, and pain patterns associated with various systems of the body and the implications thereof, including identification of whether physical therapy is indicated or whether a client requires referral to appropriate healthcare practitioner.
- Evaluate published case studies of physical therapy practice, research, and education related to differential diagnosis or pathological disorders.
- Verbalize or write a logical and appropriate line of questions for client assessment to obtain a history and to establish a working diagnosis.
- Recognize and list signs and symptoms of emergency medical conditions and describe intervention including procedures for obtaining appropriate medical assistance.
- Identify and differentiate between the clinical patterns associated with common problems of the major systems of the body.
- Given a case study, establish an appropriate physical therapy examination, evaluation, diagnosis, prognosis and intervention including procedures for obtaining appropriate referral to, and assistance from other members of the healthcare community.

Course Outline

Module	Topic
1.	Introduction to Screening for Referral
2.	The Interview – What and how to ask the important screening questions.
3.	Pain Types and Referred pain behavior
4.	Red Flag Signs & Symptoms – Neurologic, Cardiopulmonary, Organ Systems
5.	Red Flag Signs & Symptoms – Oncology, Immunologic Disease
6.	Hypertension, DVT, and PE

NRTI 6149 and 6149WI: Neurologic Rehab Interventions Wheelchair Seating and Positioning

This purpose of this course is to improve the participant's knowledge base on the evaluation and intervention techniques using assistive technology. It will encourage participants to use the latest evidence with inclusion of assistive technology as an integral part of the comprehensive evaluation and intervention process. The primary focus will be on wheelchairs and seating systems and its connection to body function and structures and participation. This course will also focus on the use of assistive technology to maximize client's participation. Using the latest evidence, participants will develop skilled observation, problem solving and clinical reasoning skills to interpret the evaluation data and translate it into most appropriate features for the wheelchair seating, mobility and assistive technology products. This course will be self-paced online and there will be 10 hours of classroom/lab experience.

Course Objectives

- Describe the benefits of appropriate seating and positioning for a wheelchair user.
- Identify potential candidates and clinical presentations appropriate for a seating and positioning intervention.

- Accurately and thoroughly evaluate a patient for optimum seating and positioning.
- Determine appropriate goals of a seating and positioning intervention.
- Identify, compare and select product(s) to meet determined goals.
- The key elements of documentation necessary for reimbursement.
- Identify potential sources of and justification for third-party funding of wheelchair modifications, accessories and components that facilitate optimum seating and positioning.

Wheelchair Seating and Assistive Technology

This purpose of this course is to improve the participant’s knowledge base on the evaluation and intervention techniques using assistive technology. It will encourage participants to use the latest evidence with inclusion of assistive technology as an integral part of the comprehensive evaluation and intervention process. The primary focus will be on wheelchair seating and its impact upon body function and structures and participation. This course will also focus on the use of assistive technology to maximize client’s participation. Using the latest evidence, participants will develop skilled observation, problem solving and clinical reasoning skills to interpret the evaluation data and translate it into most appropriate features for the wheelchair seating, mobility and assistive technology products. This course will be self-paced online and there will be 10 hours of classroom/lab experience.

Course Objectives

Online

- Identify the steps of the wheelchair assessment and procurement process
- Identify the components of a mat evaluation and translate the findings into wheelchair and seating system product features
- Incorporate current best evidence into the wheelchair and seating system evaluation and intervention process
- Demonstrate the ability to identify problems, formulate clinically relevant questions, and utilize resources to investigate questions and generate hypotheses related to the wheelchair and seating system intervention
- Understand the need to incorporate assistive technology into evaluation and intervention

Onsite

- Mat evaluation – fixed, flexible, and difficult to correct deformities
- Translation of mat evaluation findings into wheelchair and seating system product features
- Incorporation of assistive technology into treatment intervention

Course Outline

Modules	Topics
1.	Steps of the wheelchair assessment and procurement process
2.	Assistive technology and wheelchair seating evaluation
3.	Mat evaluation – fixed, flexible, and difficult to correct deformities
4.	Translation of mat evaluation findings into wheelchair and seating system product features

5.	Wheelchair and seating system product features – What is the best?
6.	Case Studies –Identification of problems, formulation of clinically relevant questions, current evidence, hypotheses for AT intervention
7.	Incorporation of assistive technology into treatment intervention
8.	Hands on lab

Electrical Stimulation

The purpose of this course is to improve the participant’s knowledge and clinical application of electrical stimulation to improve strength, function, and fitness in people with neurological dysfunction. This course includes 6 hours of self-paced online learning and 6 hours of onsite learning.

Course Objectives

- Discuss electrical stimulation applications for improving strength and function for people with neurologic dysfunction.
- Discuss precautions and contraindications for the use of electrical stimulation.
- Differentiate between direct vs. therapeutic benefits of functional electrical stimulation.
- Describe the potential for health and fitness benefits of electrical stimulation.
- Apply knowledge about electrical stimulation parameters to achieve desired muscle response.
- Design and conduct an intervention with electrical stimulation based on examination findings and patient goals.

Course Outline

Online Modules

Module	Topic
1.	Principles of electrical stimulation – 1 hour
2.	Electrical stimulation for muscle strengthening, range of motion and spasticity – 1 hour
3.	Functional electrical stimulation (FES) – 2.5 hours
4.	Case studies and quiz – 1.5 hours

Onsite Class Session (8 hours)

Examination and Intervention for

Module	Topic
1.	Electrical stimulation for muscle strengthening
2.	FES for upper extremity function
3.	FES for walking
4.	FES for exercise
5.	FES for other functional activities

NRTI 6159 Locomotor Training and Robotics

The purpose of this course is to improve the participant's understanding of the scientific basis, hands on skills, and clinical decision- making for providing both manual and robotic locomotor training. Participants will also learn how to quantify recovery after spinal cord injury using the Neuromuscular Recovery Scale and use this as a basis for treatment progression. This course is blended with both online and classroom learning.

Course Objectives

Online

- Demonstrate a working knowledge of the basic science related to activity based therapy
- Demonstrate a working knowledge of the difference between manual and robotic locomotor training
- Demonstrate a working knowledge of the guiding principles of activity based therapy, with an emphasis on locomotor training on the treadmill, over ground and in the community.

Onsite

- Identify and incorporate the principles of locomotor training during patient evaluation and progression
- Demonstrate knowledge of trainer positions and the roles of each trainer during locomotor training
- Demonstrate introductory level hands on skills as a trainer of locomotor training

Course Outline

Modules	Topic
1.	Recovery versus compensation
2.	Basic science related to activity based therapy
3.	Translation of scientific evidence to clinical practice
4.	Introduction to locomotor training: step training, overground assessment and community integration
5.	Neuromuscular Recovery Scale
6.	Patient progression
7.	Onsite - Manual facilitation hands on skills training

NRTI 6230 Neurological Imaging

Many patients with neurologic disorders have had some form of diagnostic imaging, yet they routinely have limited knowledge of how their diagnostic imaging results relate to their current problem. What should physical therapists know about diagnostic imaging (i.e., plain film radiography, magnetic resonance imaging, nuclear scans, and computed tomography) to facilitate appropriate patient education and management, as well as maximize outcomes?

This course will provide physical therapists with an understanding of diagnostic imaging principles that can be immediately integrated into their clinical practice. The indications and diagnostic utility for different imaging procedures for the head, neck, brain and spine will be described. Common pathologies seen on different diagnostic imaging modalities will be discussed. Using interactive patient case examples, learners will place imaged pathology into

the appropriate clinical context to assist with the evidence-based evaluation and management of the patient. An emphasis of this course will be on clinical decision-making principles in an outpatient, direct access physical therapy setting. However, the principles presented will be applicable to any clinical setting.

Course Objectives

- Engage in the diagnostic process using neuroimaging procedures when appropriate to establish differential diagnoses across systems and across the lifespan.
- Determine the most appropriate neuroimaging procedure according to the patient/client presentation and the current best evidence for diagnosis.
- Determine the most appropriate neuroimaging according to patient/client presentation, current best evidence for diagnosis, and current best evidence for reducing ionizing radiation exposure.
- Describe a systematic approach to the analysis of plain film radiography, magnetic resonance imaging, nuclear scans, and computed tomography and determine the relevance of visualized pathology to clinical decision making.
- Use evidence based diagnostic imaging procedures as appropriate to help determine the patient/client who would benefit from physical therapy interventions and the patient/client who requires referral for medical services.
- Review diagnostic test studies on neuroimaging according to evidence-based criteria for validity, including an explanation of radiographic clinical decision rules for orthopedic pathology related to the spine and extremities.
- Understand basic concepts of neurologic image acquisition and interpretation.
- Recognize the appearance of normal anatomy and common pathology on neuroimaging to facilitate diagnostic accuracy and appropriate intervention strategies.
- Effectively educate patients and clients regarding their diagnostic imaging results.
- Formulate an enhanced working vocabulary of diagnostic and interventional neuroimaging terminology and appropriately communicate with other medical professionals using the language of diagnostic imaging.

Course Outline

Module	Topic
1.	Introduction and diagnostic imaging
2.	Skull plain films, cervical spine, lumbar and thoracic spine
3.	Brain CT and MRI basics
4.	Demyelinating disease, metabolic syndromes
5.	Interventional procedures, angiography and spine pain management
6.	Infections and tumors of the neurologic system, nuclear medicine neuroimaging

NRTI 6240: Pharmacology for the Neurologic Patient

This is a six course is intended to complement entry level education on neuropharmacology and clinical lab testing. The first three modules focus on the clinical application of key

pharmacology principles in an outpatient neuro and musculoskeletal physical therapy setting. Basic concepts of pharmacokinetics and pharmacotherapeutics are covered, followed by a specific focus on medications commonly prescribed for pain control, cardiovascular disorders, diabetes, and pulmonary disorders. Specific topics such as antidepressant, anti-seizure and anti-parkinson medications will also be reviewed. Stroke management and guidelines will also be discussed. Discussion of these broad categories of drugs will cover clinical application, intended therapeutic effects, and potential adverse effects. Finally, we will provide a brief overview of commonly used nutraceuticals and nutritional supplements. The final module provides an overview of a core set of clinical lab tests that physical therapists should understand and be confident suggesting to medical providers or ordering themselves (based on the physical therapist's practice act or credentials). The clinical lab tests discussed include basic biochemistry, immunology, hematology, & microbiology tests.

Course Objectives

- Understand the basics of pharmacokinetic and pharmacotherapeutics principles and how they impact our patients
- Identify indications for common classes of drugs, as well as their intended therapeutic actions, potential side effects, and potential implications for physical therapy practice.
- Use information on therapeutic actions, potential side effects, and implications for PT practice in planning and modifying patient plans of care.
- Use selected web based resources on pharmacology.
- Understand key indications for requesting selected clinical lab tests, as well as the ranges for normal test results.
- Understand potential reasons for abnormal clinical lab tests, and identify a plan of action once an abnormal clinical lab test is identified.

Course Outline

Module	Topic
1.	Pharmacokinetics and Management of Pain and Inflammation
2.	Anti-Parkinson, Anti-psychotic, and anti-seizure medications, Management of Neuropathies
3.	Stroke management and guidelines
4.	Cardiovascular, GI and GU Medications
5.	Diabetes and Pulmonary Medications
6.	Management of Demyelinating Diseases, Clinical Lab Tests

NRTI 6150: Pediatric/Health Promotion/Aging with a Disability Motor Development/Age Appropriate Care for Pediatrics

The Neurologic physical therapist should be aware of normal motor development and age-appropriate care when working children with neurological diagnoses. This course is an overview of normal motor development for the neurologic clinician.

Course Objectives

- Describe normal development, including normal milestone achievement.

- Describe considerations for provision of age-appropriate care for the pediatric and adolescent patient groups

Health Promotion/Aging with a Disability

This course presents current public health issues relevant to physical therapist practice in neurologic settings. The resident will gain knowledge of physical activity, principles of behavioral change, and prevention of secondary conditions to promote health and wellness, particularly as people age. Focus will be on practical application for prevention of illness and promotion of health and wellness for selected populations (and their caregivers, as applicable). Objectives will be met through on-line lecture guide, assigned readings, and discussion of patient/client cases.

Course Objectives

- Recognize public health issues of patients/clients with disability due to neurologic diagnoses and the role of health promotion relevant to physical therapist practice.
- Identify resources about public health and describe selected health initiatives.
- Describe how selected health behavior models can be used to promote healthy behaviors and determine readiness to change.
- Advocate for primary, secondary, and tertiary preventive care in clinical and/or community settings.
- Develop self-efficacy for discussing health promotion and illness prevention (including prevention of secondary conditions) with patients, clients, and/or caregivers.
- Assess people aging with a disability, at various levels within the ICF framework.
- Discuss specific barriers and facilitators to health promotion and illness prevention in people with disability.

NRTI 6160: Administrative Topics

Ethics Course

This course will introduce the student to the APTA's core ethics documents and discussed how the guide to professional conduct and code of ethics applies to various practice situations. Students will learn the how these documents might be used by licensure boards and/or other regulatory agencies as a legal standard in a disciplinary action.

Course Objectives

- Students will know what APTA's core ethics documents are and where to find them on APTA's website.
- Students will be able to apply the Code of Ethics to various practice situations, including but not limited to interactions with patients, coding and billing issues and business/referral relationships.
- Students will learn how to analyze how the Guide to Professional Conduct and Code of Ethics may be integrated into their state practice act and rules/regulations.

Coding & Billing

This course will introduce the student to the CMS website and identify the Medicare Manuals and other documents that set forth the coding and billing rules and standards for Medicare patients. Coding and billing issues in commercial insurance plans, including contract terms, that differ from how coding and billing is done in the Medicare program will be discussed. Students will also be introduced to coding and billing issues that might be unique to different practice settings.

Course Objectives

- Students will be able to identify resources for ICD-10 and CPT coding issues and know where to find and how to keep up with Medicare coding/billing rules on the CMS website.
- Students will learn how to determine what coding rules apply to commercial insurance plans, including but not limited to the use of modifier codes and the CMS “8-minute rule.”
- Students will be able to identify unique coding and billing rules and issues that might apply to specific their practice setting.

Clinical Education

One of the primary hats a physical therapist (PT) wears is that of an educator. PTs educate patients, caregivers, peers, interdisciplinary team members, students, and the community about PT interventions, current evidence, health and wellness, in addition to numerous other subjects. Entry-level PT programs offer just a glimpse of how to be a successful educator. We are often left to teach ourselves how to be effective teachers, through practicing trial-and-error, modeling ourselves after other PT educators, and application of concepts learned in continuing education courses. In his book, What the Best College Teachers Do, Ken Bain summarizes years of research that he conducted on a variety of college campuses that describes what behaviors and attitudes are held by the best college teachers. Physical therapists can easily translate the concepts described by Mr. Bain to the clinic or the classroom, to boost the learning of those being taught.

During this course, the students will participate in mentored discussions of the book written by Ken Bain, utilizing a discussion board format, in order to synthesize and apply the concepts to both clinical and classroom teaching.

NRTI 7280 Neurologic Certified Specialist (NCS) Test Preparation Course

The purpose of this course is to prepare residents and advanced clinicians for taking the Neurologic Certified Specialist Exam. The course covers the most current up-to-date information as outlined by the APTA Neurology Section’s Resource List; in addition to online videos, lectures, and practice tests.

This course is based off a twelve-week model, although students can spread this course over the course of 4-6 months. The course begins with a 50-question sample test to inform the

student on their current areas of strengths and weaknesses. Each week involves an online video, multiple lectures, and sample test questions that will help prepare the candidate for taking the Neurologic Certified Specialist Exam. This course finishes with a 100-question practice test and again allowing the student to measure their current areas of strengths and weaknesses prior to taking the NCS Exam.

Basic Course Setup

50 Question Pre-test

Weekly sections (12) will include:

- Reference Guide as pre-reading
- 20-30 minute Online Videos with references and 10-12 post-video questions
- 2-3 Online Lectures as PPTs for home review
- Online links for references
- Review Coursework and additional study material

100 Question Post-test

Topics Covered

Foundational Sciences

- Cranial Nerves
- The Autonomic Nervous System
- Neuroplasticity and Current Research
- The Neurologic Evaluation

Mechanics

- Gait Analysis
- Orthotics
- Locomotor Training
- Musculoskeletal Management

Clinical Science by Diagnosis

- Stroke Rehab
- Spinal Cord Injury Rehab
- Traumatic Brain Injury Rehab
- Parkinson's Disease (and idiopathic) Rehab
- Motor Neuron Dysfunctions: MS, ALS, PPS Rehab
- Peripheral Nervous System: GBS/CIDP, Myasthenia Gravis
- Pediatrics (Cerebral Palsy, Adolescent BI) Rehab
- Movement Disorders (Ataxia, MD, Huntington's), Cerebellar Dysfunction
- Facial Paralysis and Bell's Palsy
- Pharmacology and Outcomes Measures will be included with each diagnosis

Vestibular and Balance

- The Vestibular System
- Balance/ Visual/ Somatosensory Impairments
- Cognition/ Cogmotor Therapy

Behavioral Sciences and Additional

- Communication, Teaching and Learning Strategies, Decision Making
- Statistics and Research Design

Weekly Topics will be broken down:

Week 1

Neuroanatomy Reviewed
Neuroplasticity and Current Research

Week 2

Spinal Cord Injury

Week 3

The Autonomic Nervous System
Stroke Rehabilitation

Week 4

The Neurologic Evaluation
Motor Neuron Dysfunctions: Multiple Sclerosis
Motor Neuron Dysfunctions: Amyotrophic Lateral Sclerosis, Post-polio Syndrome

Week 5

Peripheral Nervous System: GBS/CIDP, Myasthenia Gravis
Gait Analysis

Week 6

Parkinson's Disease (and idiopathic) Rehabilitation
Locomotor Training

Week 7

Movement Disorders: Ataxia, MD, Huntington's
Movement Disorders: Cerebellum Dysfunction

Week 8

Cognition/ Cogmotor Therapy
Traumatic Brain Injury Rehabilitation

Week 9

The Vestibular System
Balance/ Visual/ Somatosensory Impairments

Week 10

Musculoskeletal Management
Exercise Conditions across the Neurologic Spectrum
Orthotics Management

Week 11

Pediatrics (Cerebral Palsy, Adolescent BI) Rehabilitation
Statistics and Research Design

Week 12

Cranial Nerve Exam

Cranial Nerves and Facial Paralysis

Case Study