Course Description
PTH 246 Neuromuscular Rehabilitation
5.0 (3.0 lecture, 2.0 lab)
Prerequisites: PTH 240, PTH 242, PTH 252
Corequisites: PTH 235, PTH 115, PTH 228, PTH 253

Course Lecture
Room 128
TTH: 8:30am-10:30am

Course Lab
Room 125
T: 10:30am-12:30pm
TTH: 1:00pm-4:00pm

Course Focus
This course introduces neurological principles, pathology and specialized rehabilitation techniques for adult care.

Text and References


Course Objectives
UNIT 1: Introduction to Rehabilitation
1. Differentiate between the central nervous system and the peripheral nervous system.
2. Review functions of the somatic and autonomic nervous systems.
3. List behaviors attributed to each hemisphere of the brain.
4. State the cranial nerves and their function.
5. Identify myotomes and dermatomes.
6. Apply sensory & motor screens to specific cranial nerves and spinal nerve roots.
7. Demonstrate the ability to perform selected parts of a sensory/motor screen with a patient who has a neurological disorder.
8. Describe basic cerebral circulation.
9. Compare symptoms of central versus peripheral nervous system injuries.
10. Define terms relevant to neurological rehabilitation.
11. Demonstrate reflex testing.
UNIT 2: Motor Control, Motor Learning, and Motor Development
1. Define terms & summarize basic principles related to motor control and motor learning.
2. Compare the hierarchic and systems model of motor control.
3. List the stages of motor control.
4. Relate stages of motor control to skill level and posture.
5. Describe reflex patterns, postural and equilibrium reactions based on neurological insult.
6. List and describe the components of the postural control system.
7. Relate postural control strategies to degree of perturbation and CNS maturation.
8. Describe the phases of motor learning.
9. Differentiate part training from whole training.
10. Compare closed loop to open loop feedback.
11. Distinguish between different types of feedback employed during motor learning.
12. Relate stage of motor learning to feedback and practice schedule.
13. Explain neuroplasticity as it relates to motor learning.
14. Describe the characteristics of a life-span approach to neuromuscular mobility (motor development).
15. Describe the influence of cognition and motivation on neuromuscular mobility (motor development).
16. Describe motor sensory changes associated with aging.

UNIT 3: Balance and Coordination
1. Recognize different states of muscle tone & define spasticity.*
2. Assess muscle tone and spasticity
3. Relate physical therapy intervention to the treatment of abnormal muscle tone.*
4. Define terms related to balance and coordination.
5. Utilize balance and coordination grading scales.
6. Differentiate between common balance & coordination impairments.
7. Explain physical therapy's role in the treatment of coordination and balance disorders.
8. Identify different systems roles as they relate to balance.
10. Identify the components and function of the vestibular system.
11. Recognize otologic diseases that can affect the vestibular system.
12. Recognize and respond to cerebral shunt malfunction.*

UNIT 4: Cerebrovascular Accidents (CVAs)
1. Define terms related to a CVA.
2. Compare and contrast ischemic and hemorrhagic CVAs.
3. Recognize early signs of CVA and the need for medical intervention.*
4. Describe the incidence, etiology and clinical manifestations of a CVA via clinical syndromes.
5. Identify common impairments associated with a CVA.
6. Identify muscle tone status following a CVA.
7. List Brunnstrom’s Stages of Recovery & describe current research to refute stated stages.
8. Describe & differentiate clinical concepts/treatment of Rood, Brunnstrom, NDT and PNF.
9. Demonstrate treatment techniques associated with Rood, Brunnstrom, NDT and PNF
10. Identify functional assessment tools used by physical therapy practitioners in treating patients following CVA.
11. Explain the use of common equipment utilized in an ICU with CVA and other neurological diagnoses.
12. Identify physical therapies role in the care of an ICU patient.
13. Explain treatment techniques employed in the care of an ICU patient.
14. Demonstrate the use of balance and coordination activities for patients who have had a CVA.
15. Relate physical therapy interventions post CVA insult.
16. Define and identify techniques used to minimize effects of “neglect”.
17. Demonstrate activities used to address bed mobility skills, transfer training, wheelchair management, and gait in patients who have sustained a CVA.
18. Identify common adaptive equipment used in rehabilitation of patients diagnosed with CVA.
19. Complete a home assessment allowing for accommodations of a patient diagnoses with CVA.
20. List common medications prescribed to neurologic patients & their purpose
21. Relate side effects of common neurologic medications to the affects they have on therapy.

UNIT 5: Spinal Cord Injuries (SCI)
1. Define terms related to spinal cord injuries (SCIs).
2. Describe the various mechanisms of injury in SCI.
3. Describe the incidence, etiology and clinical manifestation of a SCI.
4. Differentiate between complete and incomplete spinal cord lesions.
5. Describe the clinical presentation of various incomplete spinal cord lesions.
6. Relate segmental level of muscle innervation to level of function in the patient who has had a SCI.
7. Identify early intervention strategies used to stabilize a SCI to include common orthotics.
8. Describe possible common medical complications following a SCI.
9. Identify muscle tone status following a SCI.
10. Describe functional assessments that may be used with patients following a SCI.
11. Describe the role of the physical therapist assistant in the various stages of recovery from a SCI.
12. Demonstrate the ability to properly position a patient who has had a SCI
13. Explain concepts related to pulmonary function in patients who have had a SCI.
14. Demonstrate assisted coughing techniques for a patient with a SCI.
15. Demonstrate activities used to address bed mobility skills, transfer training, wheelchair management, and gait in patients who have sustained a SCI.
16. Identify various forms of adaptive equipment used in treatment of patients who have had a SCI.
17. Instruct a patient methods used to maximize ROM and function, including tenodesis.
18. Recognize activities that are associated with autonomic dysreflexia.
19. Describe signs and symptoms of autonomic dysreflexia.
20. Provide patient education regarding self-stretching programs for the patient who has had a SCI.

UNIT 6: Traumatic Brain Injuries (TBIs)
1. Define terms related to traumatic brain injury (TBI).
2. Differentiate between an open and a closed head injury.
3. Describe the incidence, etiology and clinical manifestation of TBI.
4. Describe common medical complications that may be related to a TBI.
5. Identify muscle tone status following a TBI.
6. Compare functional assessments that may be used with patients following a TBI.
7. Identify the role of physical therapy in the various stages of recovery from a TBI.*
8. Demonstrate the ability to properly position a patient who has had a TBI.
10. Demonstrate activities used to address bed mobility skills, transfer training, wheelchair management, and gait in patients who have sustained a TBI.
11. Identify various forms of adaptive equipment used in treatment of patients who have had a TBI.
12. Discuss basic concepts related to integrating cognitive task components into physical therapy intervention sessions.
13. Identify strategies to effectively manage aggressive patient behaviors.

UNIT 7: Progressive Neurological Diseases

Describe the incidence, etiology, and clinical manifestations of common progressive neurological diseases: Amyotrophic Lateral Sclerosis (ALS); Guillain-Barre (GB); Multiple Sclerosis (MS); Parkinson’s Disease.
1. Describe the typical medical and surgical management of persons with common progressive neurological diseases.
2. Identify specific physical therapy treatment interventions used in common progressive neurological disease.*
3. Relate patient’s stage in the disease progression to therapeutic interventions.
4. Determine strategies for patient and family education that address functional limitations common during progressive neurological diseases.
5. Relate the patient’s stage of disease to the continuum of care provided for neurologic patients.

Clinical Outcomes
1. Demonstrate central and peripheral nerve testing
2. Demonstrate neurological rehabilitation techniques
3. Demonstrate neurological patient handling skills
4. Educate patients with neurological disorders and care givers in the use of the following intervention strategies as outlined in the Plan of Care developed by a licensed physical therapist:
   a. Transfer Training
   b. Wheelchair Training
c. Gait Training
d. Activities of Daily Living
e. Breathing and Coughing Techniques
f. Assessment of pulmonary dysfunction (BORG/Dyspnea Scales)

Student Contributions
Classes are designed to employ a variety of teaching techniques. In order to maximize learning, required readings and Web enhanced sections should be done prior to class. If a student is falling behind in clinical performance and/or academic achievement, it is imperative to seek immediate assistance from the instructor.

Course Evaluation
Graded activities:
5 Tests @ 100 pts. each 500
Final 200
Home Evaluation & Recommended Modifications 50
Lab practical 100
Case studies 50
Competency Checks 75
Book review 25
Total 1000

GRADING POLICY
Grading scale
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Grading Methodology. The final grade must be 75.00% or more in order to pass the course and progress in the program. In addition, each student must pass the final exam with a grade of 75.00% or above. If a student fails the final exam a second attempt will be given. The highest score a student can achieve on the second attempt is 75% and the final grade will be a C. Students absent from an examination or presentation will receive a “0” grade for the examination unless other arrangements are made with the individual instructor prior to the examination or presentation day or on the examination or presentation day before the test/presentation is scheduled to be given. It is the responsibility of the student to contact the appropriate instructor to arrange to make up the examination. Arrangements may be completed by telephone. If the instructor is not available, a message should be left on the instructor’s voice mail AND with another member of the faculty or administrative assistant. The instructor will decide the time and method of make-up examinations on an individual basis. Messages sent by other students are unacceptable. The student is responsible for notifying the instructor of the reason for the absence. Grades are posted on Blackboard within one week of administration of tests and examinations.

Each student must demonstrate safety and competence in required laboratory skills. Students are responsible for insuring that laboratory skills are checked off by the instructor. The Laboratory Skills
Achievement List for this course can be found at the back of this syllabus. All laboratory skills must be passed with a minimum score of 75% in order to pass the course. Students will be given three opportunities to pass the each skill check. In addition, the student must pass the practical exam (score 75% or greater) in order to pass the course. Should the student fail the practical exam, they will be given one opportunity to retake the exam. The highest possible score on retaking the exam is 75.00%. Non-compliance with a critical safety criterion will result in an automatic failure on skills checks as well as practical exams.

ADA STATEMENT
The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8228 during the first ten business days of the academic term.

ATTENDANCE
1. The College’s statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.
2. Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
3. Students taking an online/internet class must sign in and communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
4. Reinstatement requires the signature of the division dean.
   a. In the event it becomes necessary for a student to withdraw from the course OR if a student stops attending class, it is the student’s responsibility to initiate and complete the necessary paperwork. Withdrawing from class may have consequences associated with financial aid and time to completion.
   b. When a student exceeds the allowed absences, the student is in violation of the attendance policy. The instructor MUST withdrawal the student with a grade of “W”, “WP”, or “WF” depending on the date the student exceeded the allowed absences and the student’s progress up to the last date of attendance or
   c. under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.
   d. Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.
5. A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.
6. Students are expected to be in class on time. Arrival to class after the scheduled start time or leaving class prior to dismissal counts as a tardy. Three tardies and/or early departures are considered as one absence unless stated otherwise.
7. It is the student’s responsibility to sign the roll/verify attendance with instructor upon entering the classroom. Failure to sign the roll/verify attendance results in a recorded absence. In the event of tardiness, it is the student’s responsibility to insure that attendance is marked. The student is responsible for all material/ announcements presented, whether present or absent.
8. Continuity of classroom and laboratory (which includes clinical experiences) is essential to the student’s progress in providing safe and competent patient care. Students are expected to use appropriate judgment for participating in clinical activities. To evaluate the student’s knowledge and skills, it is necessary for the student to be present for all clinical experiences. If absence does occur, the designated clinical site, in addition to the Division of Health Sciences Administrative Assistant, must be notified by telephone no later than 30 minutes prior to the start of the clinical experience. The Division of Health Sciences telephone number is 843-525-8267.

A copy of TCL’s STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL) is on file in the Division Office and in the Learning Resources Center.

HAZARDOUS WEATHER
In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVV 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVA 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. www.tcl.edu/textalert.asp

ACADEMIC MISCONDUCT
There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student’s responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the TCL Student Handbook, the Division Office, and the Learning Resources Center.

Health care professionals hold the public trust. Academic misconduct by health science students calls that trust into question and academic integrity is expected.

It is a fundamental requirement that any work presented by students will be their own. Examples of academic misconduct include (but are not limited to):

1. copying the work of another student or allowing another student to copy working papers, printed output, electronic files, quizzes, tests, or assignments.
2. completing the work of another student or allowing another student to complete or contribute to working papers, printed output, electronic files, quizzes, tests, or assignments.
3. viewing another student’s computer screen during a quiz or examination.
4. talking or communicating with another student during a test.
5. violating procedures prescribed by the instructor to protect the integrity of a quiz, test, or assignment.
6. plagiarism in any form, including, but not limited to: copying/pasting from a website, textbook, previously submitted student work, or any instructor-prepared class material; obvious violation of any copyright-protected materials.
7. knowingly aiding a person involved in academic misconduct.
8. providing false information to staff and/or faculty.
9. entering an office unaccompanied by faculty or staff.
10. misuse of electronic devices.

**Laboratory Skills Achievement List**
Demonstrate standard wheelchair measurement and fitting
Demonstrate PNF as an intervention strategy based on neurological impairment
Demonstrate central & peripheral nerve testing
Demonstrate mobility skills for patients with quadriplegia and paraplegia mobility skills
Demonstrate patient handling & mobility techniques specific to patients with CVA
Demonstrate patient handling & mobility techniques specific to patients with a progressive neurological disease
Demonstrate patient handling & mobility techniques specific to patients with TBI