

PT 631 Management of Neuromuscular Health Conditions

Fall 2024

Mondays/Wednesdays 1:00 – 5:00 pm

Room E312



**COURSE DESCRIPTION:**

Students will build on their skills for examining and diagnosing patients with neuromuscular health conditions and movement system dysfunction. They will develop the clinical reasoning and critical thinking skills necessary to develop a comprehensive plan for intervention based on current motor control and learning theories that is evidence-based.

**DEPARTMENT OFFERING THE COURSE:**

UND School of Medicine and Health Sciences - Department of Physical Therapy

**CREDIT HOURS:** 4 Credit Hours

**ABOUT THE PROFESSOR & CONTACT INFORMATION:**

Name: Cindy Flom-Meland, PT, MPT, PhD, Board Certified Neurologic Clinical Specialist

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Student Hours: Send email to schedule an appointment.

Name: Amanda Wilson, PT, DPT, Board Certified Neurologic Clinical Specialist

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Student Hours: Send email to schedule an appointment.

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Office Location: UND-SMHS Suite E321, Room E328

Student Hours: Send email to schedule an appointment.

**COURSE CONTACT HOURS:**

Schedule: Mondays/Wednesdays, 1:00-4:50 pm

Lecture, Lab, Discussion/Application Activities

**COURSE PREREQUISITES:**

Registered in the professional Physical Therapy program.

**COURSE OBJECTIVES:**

The objectives of this course are to teach the student to use previously or concomitantly learned materials from the foundational & clinical sciences for the purpose of patient examination, program planning, documentation, & patient education, with emphasis on the areas of non-progressive nervous system disorders - amputations, spinal cord injuries, cerebrovascular accidents, traumatic brain injury, & progressive nervous system disorders - MS/ALS, and PD. The following objectives contribute to the Curriculum Practice Model elements of Professional Practice (communication, critical inquiry, clinical decision-making, professional behavior, individual and cultural differences, & education), Patient/Client Management (screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention, and outcome assessment), Practice Management (prevention/wellness/health promotion).

Following completion of this course, the student will be able to:

1. Utilize case studies/scenarios, to apply clinical decision-making (CDM) skills in evaluating motor function assessment data and define the major responsibilities of the physical therapist in planning effective treatments. (ICF Models)
2. Employ appropriate examination and/or reexamination procedures, including:
  - a. Identification of those examination parameters within the purview of physical therapy in which the student has competence; list and demonstrate the appropriate tests and measures based on the working diagnosis of the patient. The parameters include, but are not limited to:
    - i. Joint integrity and mobility
    - ii. Range of motion (ROM)
    - iii. Muscle performance (strength/MMT)
    - iv. Gait, locomotion, and balance – gait/wheelchair
      1. Identification of deviations
      2. Identification of bracing or splinting needs
      3. Identification of the most efficient gait pattern
    - v. Motor function (motor control and motor learning)
      1. Dexterity, coordination, and agility
      2. Initiation, modification, & control of movement patterns & voluntary postures
    - vi. Neuro-motor development and sensory integration
      1. acquisition and evolution of motor skills
      2. postural, equilibrium, and righting reactions
    - vii. Neurological assessment
      1. Arousal, attention, and cognition
      2. Communication/dysphagia
      3. Sensory/proprioception and perceptual integrity
      4. Balance and vestibular function
      5. Cranial and peripheral nerve integrity
      6. Reflex integrity
      7. Muscle tone
    - viii. Respiratory function (spirometry, auscultation, chest mobility)
    - ix. Circulation – cardiovascular function (HR, BP, pulses, edema)
    - x. Aerobic capacity and endurance
    - xi. Self-care and home management (ADL & IADL) – functional assessment
    - xii. Environmental, home and work (job/school/play) barriers
    - xiii. Posture
    - xiv. Integumentary integrity (wounds/lesions, photosensitivity)
    - xv. Transfers/bed mobility/positioning activities
    - xvi. Assistive and adaptive devices/equipment (AADE)
      1. Practicality/acceptability of the device
      2. Cost of the device versus benefit
      3. Safety
      4. Proper fit/adjustment
    - xvii. Orthotic, protective, and supportive devices
    - xviii. Pain
    - xix. Ergonomics and body mechanics
  - b. Identify obvious deviations from normal and correlate these findings to the knowledge of the health conditions in question, including:

- i. Procurement and listing of relevant patient-provided data
    - ii. Listing of relevant data from patient's chart (history)
  - c. Identify precautions and/or contraindications to the examination procedure and therapeutic intervention, including display of good judgment relevant to administration of the test.
  - d. Describe standard positions and administer appropriate examination procedures in a safe manner.
  - e. Recognize and record pertinent test data, including aberrant responses.
  - f. Evaluate/interpret the test findings, assign a diagnosis, and document the findings in relevant functional terms, to the patient's condition and prognosis.
  - g. Determine whether further diagnostic work-up is required, whether re-referral to physician is necessary, and whether other health services should be recommended; document and initiate if necessary.
- 3. Recovery of Function and Motor Learning:
  - a. Apply the principles of motor learning as discussed in class and in assigned readings, to teaching or promoting acquisition of functional motor skills in neurologic clients, including knowledge and application of neuroplasticity principles.
  - b. Discuss the concepts of resources and constraints (for the individual, the task, and the environment) in skill acquisition and analyze these components given a hypothetical neurologic case study.
  - c. Given clinical case problems, analyze the patient's stage of motor learning and discuss the therapist and patient's role at each stage.
  - d. Discuss the key principles of structuring practice sessions for functional skill training and design optimal practice schedule given a neurologic case study.
  - e. Define various types of feedback used in motor learning (intrinsic, extrinsic, KR and KP) and design optimal feedback schedules for a given hypothetical client with a neurological health condition.
- 4. Plan a therapeutic intervention program, based on the collective findings, and:
  - a. Clearly state measurable short-term and long-term goals
  - b. Demonstrate effective written, oral, and nonverbal communication with patients and their families, colleagues, and other health care providers.
  - c. Re-examine, review, and modify plan, intervention, and goals.
  - d. State and be able to document the physical therapy procedure to be used, its indication, and proposed benefit.
  - e. Identify possible adaptations, including therapeutic equipment and assistive/adaptive devices that may be needed.
  - f. Recognize the influence of biological, psychological, cognitive, social, and diversity factors on compliance and the achievement of goals.
  - g. Implement developmental activities, as indicated.
- 5. Instruct the patient in techniques to maximize capabilities using motor control/learning techniques and implementation of therapeutic intervention program, including strengthening/gait/balance/mobility/coordination/postural training for patients with the following health conditions:
  - a. Traumatic brain injury (TBI) – the student will be able to:
    - i. Define the difference between a local and diffuse injury to the brain.
    - ii. Describe acute complications associated with brain injury.
    - iii. Name and describe two different clinical rating scales used to define recovery from TBI.
    - iv. Describe the significant factors that should be considered when assessing and treating individuals with a head injury.

- v. Explain how cognitive deficits can have an impact on the physical therapist's interactions with an individual recovering from head injury.
  - b. Cerebrovascular accident (CVA) – the student will be able to:
    - i. Discuss and identify problems and interventions associated with a CVA, including but not limited to:
      - 1. Aphasia/dysphagia
      - 2. Perceptual difficulties
      - 3. Cognitive function
      - 4. Psychological attitudinal difficulties
      - 5. Abnormal tone
    - ii. Discuss differences of (R) versus (L) hemiparesis
  - c. Spinal cord injury (SCI) – the student will be able to:
    - i. Discuss and identify problems and interventions with spinal cord injury, including:
      - 1. Motor/sensory loss and body position/pressure relationships (ASIA)
      - 2. Bowel, bladder, and sexual function (possible impairment(s) and related psychological or physiological implications.
      - 3. Orthostatic implications.
      - 4. Wheelchair positioning/mobility, transfers/bed mobility, and gait.
    - ii. Analyze the functional potentials/skills for any given level of cord injury.
  - d. Discuss problems and interventions for people with progressive CNS disorders including multiple sclerosis (MS), ALS, Huntington's Disease, and Parkinson's disease (PD).
  - e. Prosthetic and orthotics – the student will be able to:
    - i. Identify various amputation levels.
    - ii. Analyze gait (normal gait patterns and able to recognize any deviations).
    - iii. Identify different types of prostheses/orthotics and their basic components, including proper fit and adjustment.
    - iv. Identify and discuss problems and interventions associated with amputations, including residual limb hygiene and care of the prosthesis.
6. Participate in assessing and providing primary care to patients with neuro/musculoskeletal dysfunction, during patient lab classes, pro bono clinics, and /or available clinic time.
  7. Train the patient to make maximal use of his/her capabilities by training in applicable activities of daily living (ADL).
  8. Recognize the importance of health maintenance and promotion and prevention of disease and disability and participate in identifying the health needs of individuals through screening, prevention, and/or wellness programs in the community.
  9. Provide patient and family quality education when instruction in physical therapy interventions, including home exercise program instruction.
  10. Participate in discharge planning and referral to other community resources, as indicated.
  11. Value the role of the physical therapist as a team member in rehabilitative process.
  12. Understand current ADA legislation, patient rights and CARF guidelines.
  13. Describe current reimbursement issues and guidelines.
  14. Complete written patient projects/case scenarios which include:
    - a. Devise/justify an appropriate examination form and choose a functional assessment tool for the stated diagnosis.
    - b. Identify body structure and function impairments, activity limitations, and participation restrictions that will be addressed.
    - c. Write short term and long-term goals.
    - d. Generate a detailed intervention plan to meet the established goals.
    - e. Compose a home exercise program, including patient/family education material.

- f. Provide recommendations for adaptive equipment, assistive devices, support services, environmental changes, referrals, etc.
15. Demonstrate professionalism in all interactions with patients/clients, families, and other health professionals.

**COURSE SCHEDULE AND OUTLINE OF CONTENT:**

See attached schedule.

**DESCRIPTION OF TEACHING METHODS AND LEARNING EXPERIENCES:**

Lecture – traditional lecture.

Discussion/collaborative work – students work collaboratively on case studies.

Lab – hands-on skills of neuro facilitation and handling skills, functional assessments

**COURSE MODE OF DELIVERY:**

Synchronous, in-person

**MATERIALS – TEXT, READINGS, & SUPPLEMENTARY READINGS:**

- Required:** (1) Physical Rehabilitation, O'Sullivan & Schmitz (8<sup>th</sup> ed – FA Davis) **Case videos**  
(2) Improving Functional Outcomes **free online** in Accessphysiotherapy

**Reference Books (free online through UND Med Library) Accessphysiotherapy**

- (3) Neurologic Rehabilitation, Nichols-Larsen (2016); Section II (McGraw-Hill Educ)  
(4) Laboratory Manual for Neurologic Rehabilitation, Kegelmeyer DA (2020) – **videos**  
(5) Neuro Notes: Clinical Pocket Guide (2009)  
(6) Motor Learning & Control 12e, Magill & Anderson 2017  
(7) Vestibular Rehabilitation, Herdman S (2014) – Videos  
(8) ICE Learning Center – UNDSMHS library (Stroke/TBI/Ped/ortho **videos**)  
(9) Movement Disorders 3e, Watts/Standaert/Obeso Multimedia **videos** – DD Clinical Disorders  
(10) Spinal Cord Injury Rehabilitation, Field-Fote E (2009)  
(11) Prosthetics and Orthotics (2011), Bella May (FA Davis)

**Recommended:**

- (12) Spinal Cord Injury: Functional Rehabilitation (3rd ed), Somers

Websites: 1) [www.strokingengine.ca/](http://www.strokingengine.ca/); 2) [www.rehabmeasures@shirleyryanabilitylab.org/](http://www.rehabmeasures@shirleyryanabilitylab.org/); 3) [www.neuropt.org](http://www.neuropt.org), 4) [www.stroke.org](http://www.stroke.org), 5) [www.physio-pedia.com/](http://www.physio-pedia.com/) 6) [www.pva.org/](http://www.pva.org/) 7) [apta.org/continuingeducation](http://apta.org/continuingeducation) 8) [COMBI.org](http://COMBI.org) (9) [PhysioU – videos](#) 10) [Vestibular.org](http://Vestibular.org)

**METHODS OF STUDENT EVALUATION:**

In this course, your learning will be assessed in the following ways:

- Written examinations
- Practical examinations
- Assignments

## GRADING SCALE:

Grading Scale	Breakdown
A 90% to 100%	Written Examinations 64%
B 80% to 89.9%	Practical Examinations 23%
C 76% to 79.9%	Assignments 13%
F < 76%	

For more information on grading policies, please refer to the [UND-PT Scholastic Standards Document](#)

## COURSE ACCESS & TECHNICAL REQUIREMENTS

This course was developed and will be facilitated utilizing Blackboard. For access go to: <http://blackboard.UND.edu> and log in with your NDUS Identifier. If you do not know your NDUS Identifier or have forgotten your password, please visit [Your NDUS Account Webpage](#)

Visit the [UND Technical Requirements](#) webpage for more information. Students are expected to use their official UND email in the course. For technical assistance, please contact [UND Technical Support](#) at 701.777.2222

## ARTIFICIAL INTELLIGENCE (AI)

Artificial Intelligence tools are allowed in this course as approved by the instructor(s). Students are required to disclose if they use AI-generated text or images and how they apply it in their work. Failure of students to acknowledge their use of AI or using fabricated information could result in their violation of the Academic Integrity Policy. Students must ensure the originality of their work, maintain academic integrity, and avoid any type of plagiarism. The students need to understand the material and complete assignments on their own, using AI tools as a supplement rather than a replacement for their work. Students should not use sources that are cited by AI tools without having read them because generative AI tools can either create fake citations or cite a real piece of writing, but the cited content may be inaccurate. The faculty reserves the right to use various plagiarism-checking tools in evaluating students' work, including those screening for AI-generated content, and impose consequences accordingly.

For more information on AI Policies, please visit [Artificial Intelligence Resources](#).

## UNIVERSITY OF NORTH DAKOTA POLICIES & RESOURCES:

### Nondiscrimination

It is the policy of the University of North Dakota that no person shall be discriminated against because of race, religion, age, color, gender, disability, national origin, creed, sexual orientation, gender identity, genetic information, marital status, veteran's status, or political belief or affiliation and the equal opportunity and access to facilities shall be available to all. Concerns regarding Title IX, Title VI, Title VII, ADA, and Section 504 may be addressed to Donna Smith, Assistant Vice President for Equal Opportunity and Title IX/ADA Coordinator, 401 Twamley Hall, 701.777.4171, [UND.EO.TitleIX@UND.edu](mailto:UND.EO.TitleIX@UND.edu) or the Office for Civil Rights, U.S. Dept. of Education, 230 S. Dearborn St., 37th Floor, 500 West Madison, Suite 1475, Chicago, IL 60611 or any other federal agency.

The full [Notice of Non-discrimination](#) is available online through Equal Opportunity & Title IX.

### Accessibility Statement

The University of North Dakota is committed to providing equal access to students with documented disabilities. To ensure access to this class and your program, please contact <https://und.edu/student-life/student-disability-resources/index.html> to engage in a confidential discussion about accommodations for the classroom and clinical settings.

Accommodations are not provided retroactively. Students are encouraged to register with [Student Disability Resources](#) at the start of their program. More information can be obtained by email, [UND.sdr@UND.edu](mailto:UND.sdr@UND.edu), or by phone at 701.777.2100.

## Religious Accommodations

UND offers religious accommodations, which are reasonable changes in the academic environment that enable a student to practice or observe a sincerely held religious belief without undue hardship on the University. Examples include time for prayer or the ability to attend religious events or observe a religious holiday. To request an accommodation, complete the [student religious accommodation request form](#). To learn more, please consult UND's [Religious Accommodations Policy](#) or contact the [Equal Opportunity & Title IX Office](#).

## Pregnancy Accommodations

Students who need assistance with academic adjustments related to pregnancy or childbirth may contact the [Equal Opportunity & Title IX Office](#) or Academic Affairs to learn about your options. Additional information and services may be found at [Pregnancy Resources and in UND's Protections for Pregnant and Parenting Students and Employees Policy](#).

## Reporting Discrimination, Harassment, or Sexual Misconduct

If you or a friend has experienced sexual misconduct, such as sex-based harassment, domestic violence, dating violence, or stalking, please contact the [Equal Opportunity & Title IX Office](#) or UND's Title IX Coordinator, Donna Smith, for assistance at 701.777.4171 or [donna.smith@UND.edu](mailto:donna.smith@UND.edu).

You may also contact the Equal Opportunity & Title IX office if you or a friend has experienced discrimination or harassment based on a protected class, such as race, color, national origin, religion, age, disability, sex, sex characteristics, sexual orientation, gender identity, genetic information, pregnancy, marital or parental status, veteran's status, or political belief or affiliation.

## Faculty Reporting Obligations Regarding Discrimination, Harassment, or Sexual Misconduct

It is important for students to understand that faculty are required to share with UND's Equal Opportunity & Title IX Office any incidents of potential sexual misconduct or of discrimination or harassment based on a protected class that they become aware of, even if those incidents occurred in the past or are disclosed as part of a class assignment. This does not mean an investigation will occur if the student does not want that, but it does allow UND to provide resources to help the student continue to be successful at UND. If you have been impacted by discrimination, harassment, or sexual misconduct, you can find information about confidential support services at the [Equal Opportunity & Title IX](#) webpage.

## Health and Safety

UND is committed to maintaining a safe learning environment and asks students and instructors to be flexible when necessary to promote quality learning experiences.

**Please do not attend an in-person class or lab if you are feeling ill or if you have been directed by health professionals to stay home.**

- If you are not able to attend class or lab, please notify your instructor as soon as possible and discuss options for making up any missed work.
- If you will have an extended absence due to serious illness or other uncontrollable circumstances, you may request an absence notification through [Community Standards and Care Network](#).
- If your instructor is ill, they may need to cancel class or temporarily move your course to online delivery.

Please contact [Student Health Services](#) if you have health questions by calling 701.777.4500 or visiting [myhealth.und.edu](http://myhealth.und.edu)

**PT 631: Management of Neuromuscular Health Conditions**

**Fall Semester, 2024**

**Lecture/Discussion/Lab: Mondays and Wednesdays, 1:00 – 4:50 pm**

**Faculty: Cindy Flom-Meland, PT, MPT, PhD; Amanda Wilson, PT, DPT; Michelle LaBrecque, PT, DPT**

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<b>DATE</b>	<b>LECTURE/DISCUSSION/LAB</b>	<b>READINGS</b>
8/28	Intro to Rehabilitation / CDM / ICF Model (CFM) Psychosocial Aspects of Care	1) Ch 1 1) Ch 26
<b><u>Neuro Assessment/Intervention – CVA</u></b>		
<b>9/2</b>	<b>No Class, Labor Day</b>	
9/4	Neuro/Movement System Exam/IRF-PAI (CFM)	1) Ch 2-9; 3) Ch 9; <a href="http://www.neuropt.org">www.neuropt.org</a>
9/9	Case CVA - “Sandy” Stroke video/assignment (CFM)	3) Ch 9; 4) Ch 4-6
9/11	CVA/Communication/Swallowing (AW) Lab – Neuro Assessment	1) Ch 15, 28 ANPT Stroke Edge
9/16	High Intensity Training and (AW) Motor Learning Principles, Movement Analysis	1) Ch 5, 10, 11; 2) Ch 2
9/18	NDT/Handling Skills (CFM) UE Hemiplegia/Hemiparesis Management	2) Ch 12, case 5; 4) Ch 12
9/23	Hemiplegic/Hemiparetic Standing/Gait/Orthotics (AW) Lab – cases, transfers, STS, Standing, Gait	1) Ch 30 (pg1149-1161 and 1169-1177) 3) Ch 11
9/25	Perceptual Deficits (CFM) Lab – cases, pusher syndrome and review	1) Ch 27; 4) Ch 13
<b>9/30</b>	<b>Exam I / Practical I</b>	
<b><u>TBI/Degenerative Health Conditions</u></b>		
10/2	TBI – Behavioral / Cognitive (AW) RLA-LOC Interventions & Case Presentations	1) Ch 19; 3) Ch 12; TBI Edge
10/7	TBI and Autonomic Dysfunction POC/interventions (AW)	
10/9	TBI – Balance/Mobility Assessments/Self-defense (CFM)	
10/14	Degenerative Diseases – MS/ALS/GBS (AW)	1) Ch 16, 17; 3) Ch 14, 16; MS EDGE



10/16 (2:00-4:00 pm) and 10/17 (10:15 am to 12:15 pm) Nursing Students Training

10/21 Degenerative Diseases-Parkinsons and Huntington's Disease; LSVT BIG  
(AW) 1) Ch 18; 3) Ch 15, PD EDGE

10/23 Parkinson Guest Lecturer and Degenerative Disease POC  
(AW)

10/25 Mobility Day – (Note: this is a Friday – class will run from 1:00-4:30 pm)

### 10/28 Exam II

10/30 no class; held for PT 640 if needed

### Vestibular Rehabilitation

11/4 Vestibular Rehab 1) Ch 21; 2) Ch 14, Case 9; 3) Ch 16  
(Jeff H) Assessment and Intervention

11/6 Vestibular Rehab  
(Jeff H) Assessment and Intervention

### 11/11 No Class, Veteran's Day

### Spinal Cord Injury Rehabilitation

11/13 Seating and Wheeled Mobility  
(Jane L)

11/18 SCI Introduction, Bowel/bladder function 1) Ch 20; 3) Ch 12; 12) Ch 1-6, 13, 14  
(CFM) Skin care / stabilization / respiratory 2) Cases 3, 7, 10, 14; 10) Field-Fote text

11/20 ASIA Assessment / Functional Potentials 12) Ch 7, 8, 9, 10, 12  
(CFM) Transfers/Gait/Intervention/Orthotics 1) Ch 9, 30, 33; 11) Bella May text

### 11/25 Exam III (vestibular rehab and seating/wheeled mobility)

### 11/27 No Class, Thanksgiving Holiday Break

12/2 SCI Assessment Lab and W/C mobility lab

### Amputation & Prosthetics

12/4 Pre-Prosthetic Program 1) Ch 14, 22; 11) Bella May Text  
(CFM)

12/9 Fabrication/Components of a Prosthesis 1) Ch 31  
(Paul E)

12/11 Prosthetic Gait / Gait Deviations 1) Ch 7, 11, 31  
(CFM)

12/16-12/20 Finals Week Exam IV and Final Comprehensive Practical – TBA; Friday is reserved for retakes