Neuromotor Science, M.S.

COLLEGE OF PUBLIC HEALTH

Learn more about the Master of Science in Neuromotor Science.

About the Program

The study of human movement, both as an outcome of health and functioning and as a means to understand the mechanisms underlying neuromotor system integration and behavior, is foundational to many health professions. The skills needed to be successful in fields of related study require fluency across the disciplines of engineering, movement science, neuroscience, and rehabilitation. The need exists for rigorously trained scientists with interdisciplinary training in neurobiology and biomechanics of the sensorimotor system, with a focus on how human movement is impacted by health conditions, disease, disability, and development.

Our Neuromotor Science (NMS) program trains students to advance the science of neuromotor control and biomechanics of human posture and movement in individuals across the lifespan and spectrum of health and disability levels. The M.S. in Neuromotor Science (MS-NMS) program is designed for individuals in the fields of engineering, exercise science, kinesiology, occupational therapy, physical therapy, rehabilitation science, and the like, preparing them to:

- advance the science and understanding of neuromotor processes, including assessment and evaluation of human movement, neuromotor function and integration, and how they are impacted by age, health, functioning, and disability; and
- contribute to the development of interventions to improve human movement, particularly posture and locomotor control, and function across the lifespan.

Time Limit for Degree Completion: 5 years

Campus Location: Main, Health Sciences Center

Full-Time/Part-Time Status: While full-time study is encouraged at the master's level, this research-focused degree program can be completed in 2 years with full-time study (9 credits per term) or 3 to 4 years if enrolled part-time.

MS-NMS students are initially advised by the NMS Program Director during admission and in the first term if an academic advisor has not been identified. Within two terms of matriculation, students are assigned an academic advisor from the core program faculty — or an available Graduate Faculty member with expertise in the student's cognate area, as approved by the NMS Program Director. Students develop an "Individualized Development Plan of Graduate Studies," which is reviewed with their advisor every term, and by the NMS Program Director and/or the Program Advisory Committee on an annual basis.

Interdisciplinary Study: Students may use their elective coursework to pursue interdisciplinary study throughout the University. The MS-NMS program participates in the interdisciplinary program in Neuroscience at Temple University.

Areas of Specialization: All students complete the same core course requirements, but may focus their elective coursework and research experiences on preparing them for future work in areas related to their specific interests.

Job Prospects: Graduates of the MS-NMS degree program are prepared for employment in clinical research, as faculty in professional programs, or in industry positions. In addition, the M.S. degree provides a strong foundation for students to continue their studies at the Ph.D. level.

Non-Matriculated Student Policy: Non-matriculated students may enroll in up to three graduate courses with permission from the NMS Program Director.

Financing Opportunities: Assistantship packages consisting of a stipend, tuition remission, and subsidized health benefits are available. Admission to the MS-NMS program does not, however, guarantee financial support. Research and Teaching Assistantships are highly competitive, with awards varying based on faculty-funded areas of research and the teaching needs of the College. Please contact the NMS Program Director for additional information.

Admission Requirements and Deadlines

Application Deadline:

Fall: March 1
Spring: November 1

All applicants to the M.S. in Neuromotor Science program must apply via the Centralized Application Service for Public Health (SOPHAS). The system can be accessed at https://sophas.liaisoncas.com/.

Letters of Reference:

Number Required: 3

From Whom: Letters of recommendation should be obtained from individuals who can speak to the applicant's potential for graduate study. At least one should be from a faculty member who is familiar with the applicant's academic abilities.

Bachelor's Degree in Discipline/Related Discipline: All applicants must present credentials that are the equivalent of a baccalaureate degree at Temple University.

A WES course-by-course transcript evaluation is required for applicants who completed their bachelor's degree outside of the United States. This can be requested at https://www.wes.org/ and submitted through SOPHAS.

Statement of Goals: In a one-page statement, articulate why you want to enroll in the MS-NMS program at Temple. State your career goals and research interests.

Standardized Test Scores:
GRE: Optional for Spring 2021 and Fall 2021 admissions. If submitted, scores from a test taken within the last 5 years must be at or above the 50th percentile in the verbal and quantitative components, with a score of 4 or higher on the writing component. Official scores should be sent directly to SOPHAS using code 0151. Otherwise, GRE scores are optional.

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 79 (send officially to SOPHAS using the SOPHAS-specific TOEFL code 5688)
- IELTS Academic: 6.5
- PTE Academic: 53
- Duolingo: 110

Interview: Students may be invited to interview with the program faculty. An interview may take place in person or through technology if cost prohibits travel to Temple.

Resume: Current resume or CV required.

Program Requirements

General Program Requirements:
Number of Credits Required Beyond the Baccalaureate: 30

Required Courses:

Code	Title	Credit Hours
Core Courses		
HRPR 5001	Current and Emerging Issues in Public Health and Health Professions	0
NMS 9621	Neuromotor Science 1: Neural Factors	3
NMS 9622	Neuromotor Science: Instrumentation	3
NMS 9623	Neuromotor Science: Programming	3
NMS 9624	Neuromotor Science 2: Mechanics and Models	3
NMS 9627	Neuromotor Science 3: Cognition and Learning	3
Statistics and Research Design Course		3
Electives [1]		**9**
Research Experience		
NMS 9654	Neuromotor Science: Laboratory Rotation and Seminar	3
Total Credit Hours		30

1 Electives are chosen from existing 5000-, 8000-, or higher-level courses to provide a cognate area based on the student's interest in, for example, engineering, kinesiology, neuroscience, psychology, public health, rehabilitation science, or teaching in higher education. *Not all courses listed in the course descriptions for this program are available to MS-NMS students.* The NMS Program Director and faculty advise on and approve the selection of electives.

Minimum Grade to be Earned for All Required Courses: B-

Culminating Event: Successful completion of coursework constitutes the culminating event.

Contacts

Program Web Address:

https://www.temple.edu/academics/degree-programs/neuromotor-science-ms-hp-nms-ms

Department Information:

Dept. of Health and Rehabilitation Sciences
Ritter Hall Annex, 6th Floor
1301 Cecil B. Moore Avenue
Philadelphia, PA 19122-6091
deptpt@temple.edu
215-204-9066

Submission Address for Application Materials:

https://sophas.liaisoncas.com/

Department Contacts:

Program Director:
W. Geoffrey Wright, Ph.D.
wrightw@temple.edu
215-204-9008

Interim Chairperson:
Scott Burns, PT, D.P.T., OCS, FAAOMPT
scott.burns@temple.edu
215-204-9016

Neuromotor Science Courses

NMS 9621. Neuromotor Science 1: Neural Factors. 3 Credit Hours.
Current theories and research pertaining to the neural mechanisms underlying motor control, sensorimotor integration and motor learning will be introduced as a foundation for understanding functional movement and motor deficits. The roles of selected brain regions as they relate to different aspects of motor behavior will be discussed. Lesions studies will be presented to further demonstrate the impact of neural impairments on movement performance and motor learning. Application of neurophysiologic methods that evaluate the relationship between neural circuitry and human movement (e.g., EMG, MRI, PET, EEG, TMS) will be discussed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9622. Neuromotor Science: Instrumentation. 3 Credit Hours.
Instrumentation is an introduction to electrical components and circuits, and their role in the function of laboratory instrumentation. The main goal of this class is to develop the student's competence in managing the instrumentation and the quality of resultant data for motion analyses through an understanding of data acquisition equipment that is appropriate to their chosen research area. The student will be exposed to basic electronic design of filters, amplifiers, and A/D sampling as well as selected pieces of laboratory instrumentation. The class is organized in a lecture/lab structure.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9623. Neuromotor Science: Programming. 3 Credit Hours.
This course is designed for students with little to no programming skills to help them with a general understanding of computer hardware, software, and the interaction between the two. Factors that make the use of the computer useful to neuromotor research will be presented. Basic computer architecture and operating systems will be discussed in this class. The student will gain a basic understanding of software programming logic and structures as well as signal processing techniques for analysis of human movement data. The goal of this course is for students to gain skills in basic programming for scientific data analysis of time series data with Matlab. In addition, students will also be exposed to software packages commonly used for movement analysis such as LabView, C, Visual-3D, and OpenSIM. The class is organized in a lecture/lab structure.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9624. Neuromotor Science 2: Mechanics and Models. 3 Credit Hours.
Application of mechanical principles to static and dynamic models of human posture and movement and of the mechanical properties of the link-segment systems and biological tissue are introduced in this course. Theoretical frameworks, computational, and statistical models (e.g., dynamical systems, equilibrium point, control theory, and Bayesian) are introduced as a basis for understanding the organization of complex movement patterns. Interpretation of the model predictions is based on both healthy individuals and those with movement deficits. The first half of the course will focus on the development of the tools necessary to conduct biomechanics research, process the data, and perform biomechanical data analysis. The second half of the course will work through common biomechanics questions related to human movement in three dimensions.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9627. Neuromotor Science 3: Cognition and Learning. 3 Credit Hours.
This course focuses on current theories and research related to cognitive and learning processes that influence motor behavior. Objectives include examination of lifespan motor development and learning, attentional mechanisms, perceptual effects on motor output, implicit and procedural memory effects on motor control, automatic compensatory responses and/or strategies following injury or disease, and the factors that influence adaptation and learning to long- and short-term changes in the body or environment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9653. Grantsmanship. 3 Credit Hours.
This course exposes the Ph.D. level student to the mechanisms and methods of acquiring funding for Behavioral and Somatic Science Research. Students will learn Grantsmanship - the skills required to write a grant proposal. Learning experiences consist of literature review, writing key sections of a grant application, and if applicable, subject recruitment. Class time will be divided into lectures and discussion of assignments.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

NMS 9654. Neuromotor Science: Laboratory Rotation and Seminar. 1 to 3 Credit Hour.
This course provides the student with an in-depth exposure to the laboratory methods and focus of a faculty member. Students will learn the conceptual basis for the research as well as technical skills such as instrumentation and data analyses pertinent to the areas of research that are core to the NMS program or in a cognate area of interest to the student. Two rotations (6 credit hours) are required for the Ph.D. degree students and a single rotation (3 credit hours) for the MS degree students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

NMS 9682. Neuromotor Science: Independent Study. 1 to 3 Credit Hour.
This course provides an opportunity for independent investigation and analysis of the intellectual, physical, social, psychological, and ethical bases of human movement. An independent study allows students to explore a well-defined area within Neuromotor Science and related fields in greater depth providing an opportunity for independent investigation and analyses of topics that enrich their academic and research training.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

NMS 9994. Doctoral Preliminary Exams. 1 Credit Hour.
This course supports preparation for taking the preliminary examinations in the Neuromotor Science program. To enroll, students must have completed all required coursework for the Ph.D. and obtain the approval of the Ph.D. Program Director. Students must be enrolled to take the required preliminary examinations.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

NMS 9998. Dissertation Proposal. 1 to 2 Credit Hour.
This course supports preparation of the dissertation proposal. The course is required for students who have passed the preliminary examinations for their programs and who have not yet defended the dissertation proposal.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

Pre-requisites:
NMS 9994|Minimum Grade of P|May not be taken concurrently.

NMS 9999. Dissertation Research. 1 to 3 Credit Hour.
This course is limited to Ph.D. candidates who have completed and defended a dissertation proposal that is filed with the Graduate School by the last day to add a course in the semester. Continuous registration in 9999 fall and spring is required until the dissertation is successfully defended.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Dissertation Writing Student.

Repeatability: This course may be repeated for additional credit.

Pre-requisites:
NMS 9994|Minimum Grade of P|May not be taken concurrently.

Physical Therapy Courses

PHTH 8101. Introduction to Physical Therapy. 1 Credit Hour.
This course introduces students to the concepts of professionalism, advocacy and the role of the physical therapist in the American health care system. Students will learn about the American Physical Therapy Association, its role in advancing the profession of Physical Therapy, and the resources available through the organization. In preparation for clinical practice students will be introduced to various documentation strategies including electronic health records.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8102. Teaching, Learning, Group Dynamics. 2 Credit Hours.
The course is designed to assist the student physical therapist in improving his/her clinical and behavioral teaching, learning, and group dynamics skill sets through activities, lectures, and group projects. The first part of the course provides instruction to the student about group dynamics. Therapists, regardless of employment location, must work in harmony with many disciplines to achieve patient goals. Teamwork and inter-professional communication are critical factors in accurate clinical decision making. Trust, leadership, dependency, group dynamic theory, and inclusion are explored in the first half of the course within the framework of the inter-professional team approach to the provision of health care. The second part of the course focuses on behaviors and teaching skills associated with the therapist-patient interaction. Students are also encouraged to reflect on their individual learning preferences and strategies for optimizing success in the classroom and clinical environments. Topics explored include the patient-therapist collaborative clinical decision model, patient education, the FOG index of teaching, verbal and written clinical teaching methodology, teaching pedagogy, distance medicine, interaction with patient families, long and short term goal setting, clinical objectives and clinical education.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8103. Clinical Examination and Intervention Skills I. 2 Credit Hours.
This is the first course in a 3-part sequence of Clinical Examination and Intervention Skills. This course includes a lecture component and lab activities. Clinical Examination and Intervention Skills (CEIS) 1 is offered as a 2 credit lecture/lab course during summer of the initial term of the DPT curriculum. The CEIS course sequence provides instruction in and practice of examination and intervention skills that can be applied to a wide variety of clinical settings and patient populations. CEIS 1 focuses on building a foundation of skills that foster increasingly complex clinical-decision making throughout the next two courses in the CEIS sequence.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8105. Human Anatomy I. 6 Credit Hours.
This course represents the composite lecture and lab components of the regional study of the gross structure of the human body. It includes classroom lecture, laboratory, and dissection activities regarding anatomical considerations for the back, upper and lower limbs, thorax, head and neck, abdomen, pelvis, and perineum. Emphasis is on the structure and function of the skeletal, muscular, cardiovascular, respiratory, and peripheral nervous systems, including their embryologic development. Students must learn origins, insertions, actions, and both spinal cord level and peripheral innervations. In addition, students must know all bony landmarks, ligaments, and tendons that support the joints under study.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8107. Functional Biomechanics. 3 Credit Hours.
Functional Biomechanics is offered as a 15-week, 3-credit course during the fall semester of the first year of the DPT curriculum and represents a course that provides an initial bridge between anatomy and physiology of the neuromusculoskeletal system, and the biomechanics of movement. The course is designed to help the DPT student understand the complex nature of human movement by using various types of models to establish a biomechanical foundation from which movement can be analyzed. Students will be expected to identify, comprehend, and apply some movement models that can be appropriately generalized across multiple portions of the body and do likewise for specific movement models of specific joints, body segments or tasks such as posture, standing and basic movement patterns.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8109. Human Physiology and Pathology I. 3 Credit Hours.
This is the first in a two-course series designed to provide first-year doctor of physical therapy students with a basic understanding of the following: normal adult human physiology, basic pathology (injury, inflammation, healing and adaptation), normal microanatomy of skin, bone and connective tissue and pathology of the cardiac, pulmonary, immune, endocrine, musculoskeletal and integumentary systems. The topics to be discussed will provide a frame of reference for the various pathophysiological states encountered by the contemporary, practicing physical therapist.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8111. Clinical Examination and Intervention Skills II. 3 Credit Hours.
Clinical Examination and Intervention Skills 2 (CEIS 2) is the second in a sequence of courses that includes theory and evidence for, and practice of, examination and intervention skills that can be applied to a wide variety of client populations seen by physical therapists. The CEIS 2 lecture and laboratory course provides a framework for upper quarter assessment and intervention. Students are expected to synthesize content from the CEIS 1 course to expand critical thinking and problem-solving with respect to clinical decision making. Additionally, this course provides the student a foundation in the basic theory and science of exercise and a central framework by which to prescribe and modify therapeutic exercise to a variety of clients.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8113. Evidence Based Practice I. 2 Credit Hours.
This is the first course in a three-course series. Evidence Based Practice I provides an introduction to the critical analysis of professional literature in preparation for practical implementation evidence based practice. Students will learn how to conduct searches of scientific and professional literature on specific topics related to physical therapy, judge the validity of information obtained through both print and electronic media, and assess the internal and external validity of research articles as sources of information on which to base clinical decisions. Students will also learn how to use web-based technology to maintain a personal database of references and prepare reports of research-based literature.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8114. Neuroscience. 3 Credit Hours.
Students will first learn basic neuroanatomical and brain vascular structures, their relationships to other neuroanatomical structures as well as basic neuroembryology, neurohistology and neurophysiology. Next, students will learn regional neuroanatomy and the main function of each regional structure, building on their new knowledge of neuroanatomy using case histories as a learning tool. Lastly, students will learn systems neuroscience, which focuses on how the regional brain structures connect and function as integrated sensory, motor, cognitive, and emotional processes, again using case histories as a learning tool. Thus, lectures, computer based labs and wet brain labs, interactive sessions and case histories comprise this course.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8115. Human Physiology and Pathology II. 3 Credit Hours.
This is the second in a two-course series designed to provide first-year doctor of physical therapy students with a basic understanding of the following: normal adult human physiology, basic pathology (injury, inflammation, healing and adaptation), normal microanatomy of skin, bone and connective tissue and pathology of the cardiac, pulmonary, immune, endocrine, musculoskeletal and integumentary systems. The course work is didactic with no laboratory component. The topics to be discussed will provide a frame of reference for the various pathophysiological states encountered by the contemporary, practicing physical therapist.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8116. Motor Control and Learning. 3 Credit Hours.
In this course theories and basic principles of motor control and learning will be integrated and related to motor behaviors observed in individuals with or without sensory and motor impairments. The students will gain experience in observing and measuring human motor behavior, which will focus on postural control, locomotion and goal-directed manual tasks. The students will learn to perform task analysis on motor skills as a method to analyze movement behavior and allow them to apply practice principles to enhance motor learning in individuals with or without sensory or motor impairments.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8118. Clinical Examination and Intervention Skills III. 3 Credit Hours.
This lecture and laboratory course is the third of a 3-part sequence and takes place during the spring semester of the first year of the doctor of physical therapy program. The CEIS 3 course provides a continuation of assessment and intervention initiated in CEIS 2 through a systematic progression of the lower extremities. Students will additionally incorporate practice of a thorough neurologic examination and balance assessment within the scope of physical therapy practice. Exercise physiology concepts are more deeply discussed, and students will be expected to demonstrate an understanding of muscle physiology in response to exercise as well as concepts surrounding aerobic assessment. Students are expected to synthesize content from the first two courses in the CEIS sequence to expand critical thinking and problem-solving with respect to clinical decision making.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8121. Clinical Electrophysiology and Biophysical Agents. 3 Credit Hours.
Electrophysiology & Biophysical Agents includes the known physiologic and physical effects, and application, of select thermal and electrical modalities (therapeutic modalities). A problem-solving approach is used to assist the student to integrate basic physiologic, physical and medical science aspects for the safe application of the modality. Electrodiagnostic testing in the context of physical therapy practice will be presented. Validity, reliability, sensitivity and specificity of select clinical tests and the effectiveness of each thermal modality/electrotherapeutic device will be addressed. Students will actively engage in the use of each modality through laboratory sessions to inform clinical decision making and demonstrate skill of device usage.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8123. Development Across the Lifespan. 2 Credit Hours.
Lifespan (PHTH 8123) offered as a combined lecture and laboratory based course consisting of the equivalent of 1 credit laboratory experiences (30 Hours) and 1 CH of lecture (15 hours) during the summer semester of the 2nd year of the Doctor of Physical Therapy curriculum. This course represents the integration of the skills and knowledge acquired from Biomechanics and Motor Control and Learning, the clinical examination and intervention courses, as well as the musculoskeletal and neuromuscular series of clinical management courses taken concurrently. This course builds upon the basic science and theory of previous coursework to allow an understanding of the mechanisms that define human movement and allow for interaction of the individual with their environment across the lifespan. A large focus of the course will be the typical trajectory of motor development (pediatrics through geriatrics) and pathologic effects which occur through the lifespan on an individual's ability to move and interact with their surroundings. The laboratories also involve discussion and training on the use of the tests for motor development, balance and posture, gait, and upper extremity function, and are supplemented with pediatric, adult, and geriatric case studies to allow for the development of the skill set necessary to allow the student to apply the tests as used in lab to the clinical arena.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8125. Clinical Management of Musculoskeletal Conditions I. 4 Credit Hours.
This is the first in a series of 3 courses in the clinical musculoskeletal management sequence. The course will build upon material from previous courses in the basic sciences and foundational clinical examination and intervention skills. Students will become proficient in a patient-centered, biopsychosocial approach to the management of patients with lower quarter musculoskeletal disorders using the current best evidence to inform clinical decision making. Students will learn a comprehensive lower quarter musculoskeletal examination scheme utilizing the most valid and reliable tests and measures. Students will learn to develop and carry out a plan of skilled physical therapy treatment interventions with an emphasis on manual therapy, therapeutic exercise, and patient education.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8127. Clinical Management of Neuromuscular Conditions I. 4 Credit Hours.
This course introduces DPT students to evidence-based practice specific to individuals with neuromuscular dysfunction. The student will apply the elements of examination, history, systems review, tests and measures, evaluation, diagnosis, prognosis, and interventions to individuals with various neuromuscular diseases and conditions using the International Classification of Function (ICF) model and clinical decision-making tools. The Task Oriented Approach and the Hypothesis Oriented Algorithm for Clinicians (HOAC II) will be emphasized. Students will gain further skill in examining and identifying impairments of the human movement system and limitations in functional activities associated with neuromuscular disorders. An emphasis will be placed on designing effective interventions for individuals with stroke, traumatic brain injury (TBI), and spinal cord injury (SCI). Clinical case examples will highlight the acute and subacute rehabilitation patient management environments. Students will also be introduced to prevention and long-term management of chronic impairments and loss of function in these individuals. The course content will include pathophysiology, epidemiology, and medical and physical therapy management of stroke, TBI, and SCI. Physical therapy examination principles and skills will be presented and practiced, including disease specific and generalized tests and measures utilized with these patient populations. Students will apply content to clinical case studies to demonstrate integration within the cognitive and psychomotor domains of learning. Case study scenarios and clinical practical examinations will be utilized to assess knowledge translation to psychomotor and clinical reasoning skills.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8129. Psychosocial Aspects. 2 Credit Hours.
The goal of this course is for students to develop a greater appreciation of the psychosocial aspects of disability and wellness. We will examine models of disability, systems affecting individuals with disabilities, psychosocial factors related to adjustment, and treatment and health-promotion models. Psychopathology and psychiatric disabilities will be examined, as well as mental health issues related to disease, chronic and acute illness, and injury.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8131. Clinical Management of Musculoskeletal Conditions II. 4 Credit Hours.
This is the second in a series of 3 courses in the clinical musculoskeletal management sequence. The course will build upon material from previous courses in the basic sciences and foundational clinical examination and intervention skills. Students will become proficient in a patient-centered, biopsychosocial approach to the management of patients with lower quarter musculoskeletal disorders using the current best evidence to inform clinical decision making. Students will learn a comprehensive lower quarter musculoskeletal examination scheme utilizing the most valid and reliable tests and measures. Students will learn to develop and carry out a plan of skilled physical therapy treatment interventions with an emphasis on manual therapy, therapeutic exercise, and patient education.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8133. Clinical Management of Neuromuscular Conditions II. 4 Credit Hours.
The course focuses on progressive disorders and selected current topics in managing neuromuscular disorders. The diagnostic groups covered include: Huntington's disease, Parkinson's disease, multiple sclerosis, amyotrophic lateral sclerosis, Alzheimer's disease, post-polio, Guillain Barre, myasthenia gravis, neurologic injuries due to infection or neoplasm, cerebellar and vestibular disorders. Examination, evaluation, diagnosis, prognosis and application of intervention will be addressed utilizing case studies to enhance application of cognitive and psychomotor skills within the lectures and laboratory experiences. The course will include epidemiologic data, pathophysiology, and medical management and lifespan changes typically seen in these disorders. Students will develop strategies to reduce barriers in the community and enhance optimal participation in patients with chronic neuromuscular conditions by identifying resources, preventing secondary impairments, addressing wellness, and personal issues. Students will learn to select appropriate outcome measures based on psychometric properties and patient related factors. The efficacy and effectiveness of interventions to address impairments and activity loss in individuals with neuromuscular disorders will be examined.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8135. Clinical Management of Cardiopulmonary Conditions. 3 Credit Hours.
The course challenges students to translate information learned in Anatomy, Physiology, Pathophysiology, and Clinical Decision Making into clinical scenarios that will represent their future practice as it relates to rehabilitation and management of individuals with cardiopulmonary conditions. Because of the evolving role of physical therapists in the health care system (including primary care), students will be expected to recognize signs and symptoms of cardiovascular and pulmonary primary and secondary diseases as they impact on the patient/client's plan of care. Students are challenged to anticipate the consequences of cardiovascular and pulmonary disease based on data collected during clinical practice. Students will gain experience in the clinical monitoring of cardiovascular and pulmonary signs and symptoms through the use of the Clinical Simulation Center. Through the use of case studies, students will need to collect and interpret clinical data from robotic mannequins programmed to display a variety of clinical scenarios that will require clinical decision making.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8136. Bioethics. 2 Credit Hours.
This course provides an overview of the field of bioethics with special emphasis on areas of applicability for future physical therapists, including methods for decision-making and problem solving; autonomy; health disparities; distributive justice; informed consent and health literacy; professionalism and codes of ethics; violence; disability ethics; and the social determinants of health. Most weeks will include an ethics case study that students will analyze using models for clinical decision-making, the APTA Code of Ethics and Standards of Physical Therapist Practice.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8137. Evidence Based Practice II. 2 Credit Hours.
This is the second course in a three course series. In Evidence Based Practice II, students will practice performing focused literature searches, documenting search strategies, evaluating the validity of clinical research studies using standard metrics and knowledge gained during Evidence Based Practice I, synthesizing multiple studies to answer a clinical foreground question, and providing a clinical bottom line. Students will work both independently and as part of a group to complete the course objectives. This course refines and allows for practice of skills needed to locate, understand, and critique research literature for clinical decision-making. Emphasis will be placed on methods used to find relevant literature and assess the validity of individual articles, systematic reviews and meta-analyses. As a result of the activities within this course, students will be able to conduct and document a focused search of the literature to answer a specific clinical question.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8138. Management and Healthcare Systems. 2 Credit Hours.
Management and Healthcare Systems is an introduction to the American Healthcare system and management of physical therapy practice. The component of the Healthcare Systems will emphasize the interconnections between the various segments of the health care system and the impact of health literacy, access, safety, reimbursement, legislation and regulation. The course will also look at the impact of consumerism and its unique characteristics in health care. It will also explore and integrate the role of physical therapy as a profession and physical therapists as professionals in the system. Further emphasis will be on class participation as a method of modeling professional behavior. Management of Physical Therapy Practices (MPTP) represents a transitional learning experience by allowing the translation of bench and clinical knowledge gained during the first year of the DPT curriculum to the procedural and management framework of developing and maintaining a physical therapy clinical practice. The student will be expected to demonstrate an understanding of how patient care assessment and intervention algorithms can meld with the parameters of reimbursement, compliance, management hierarchy, ethics, and regulatory issues in the inpatient, wellness, and outpatient settings while allowing for individual and group therapist provision of quality care and the attainment of personal and professional goals.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8139. Medical Diagnostics. 2 Credit Hours.
Physical therapists are frequently called upon to make diagnostic decisions in both primary and tertiary care roles. Furthermore, diagnostic imaging information can impact the physical therapy plan of care. Physical therapists require a basic level of knowledge about diagnostic imaging including when and what imaging study may be indicated, how the information from diagnostic imaging impacts the evaluation and plan of care, and how to have an informed discussion about diagnostic imaging with both patients and colleagues. In the course, students will gain an appreciation for and begin to develop strategies to integrate data from medical diagnostic imaging procedures. These data will include results obtained from data derived from musculoskeletal, vascular, neurologic, cardiac and pulmonary imaging. The focus will be on utilizing clinical data that documents the status as well as the progression of disease and its impact on differential diagnosis, prognostication, and physical therapy interventions. The course meets weekly for lecture and discussion.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8141. Clinical Management of Musculoskeletal Conditions III. 4 Credit Hours.
This is the third in a series of 3 courses in the clinical musculoskeletal management sequence. The course will build upon material from previous courses in the basic sciences and foundational clinical examination and intervention skills. Students will become proficient in a patient-centered, biopsychosocial approach to the management of patients with spinal disorders using the current best evidence to inform clinical decision making. Students will learn a comprehensive spinal musculoskeletal examination scheme utilizing the most valid and reliable tests and measures. Students will learn to develop and carry out a plan of skilled physical therapy treatment interventions with an emphasis on manual therapy, therapeutic exercise, and patient education.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8143. Management of the Medically Complex Patient. 3 Credit Hours.
Medical acuity and medical complexity can present in a variety of environments. The intention of the course is for students to gain exposure to and develop strategies and skills in working with individuals with both medical/surgical acuity as well as complexity. Course work challenges students to interpret medical and/or surgical events/data and anticipate the impact of that information on an individual's function. Students develop plans of care while dealing with medical/surgical equipment and treatments that might be necessary for the patient's safety. In addition, students will be challenged to anticipate the impact of past medical/surgical history, pharmacology, social history, and resources in developing a plan of care. Since students encounter individuals with medical acuity and/or complexity across the health care delivery spectrum, students will develop strategies for collaboration and coordination of services with other health professionals. Because of the evolving role of physical therapists in the health care system, students will be expected to provide safe, effective, patient-centered, equitable, timely, coordinated and evidence-based care for these individuals.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8145. Pharmacotherapeutics. 2 Credit Hours.
The course exposes student to the importance of incorporating a patient's pharmacologic management into clinical decision making, prognosis and progression. Because of the evolving role of the physical therapist in the health care system, including primary care, students must recognize the importance and impact of pharmacologic effects on safe patient management. This course explores the essential principles of clinical pharmacology. Content includes pharmacokinetics, indications and contraindications of various drugs relative to their effect on diagnosis, prognosis and interventions in physical therapy. Specific pharmacologic categories covered in the course are cardiovascular medications, chemotherapeutic agents, NSAIDs, antirheumatic agents, pulmonary medications, pain management strategies, neuromuscular medications, ionto/phonophoresis agents, different classifications of steroids and diabetes management agents. Through interactive teaching-learning lecture and online methodologies, students critically review and analyze various clinical pharmacology issues at both the individual and societal levels. Discipline-specific assignments are used to correlate pharmacologic principles of particular relevance to a variety of health professions.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8146. Clinical Management of Pediatrics. 2 Credit Hours.
Pediatric physical therapy is practiced across a wide range of ages and developmental levels, within specialized environments spanning complex medical care to non-clinical setting such as school systems. The physiological changes associated with normal and atypical development, the interpretation of standardized assessments of development, imaging, and clinical decision making in the pediatric population will be discussed. The course content will also include pathophysiology, epidemiology, medical and physical therapy management of common pediatric conditions including neuromuscular, musculoskeletal and cardiovascular/pulmonary conditions across a variety of pediatric practice settings. Physical therapy examination principles and skills will be presented and practiced, including disease specific and generalized tests and measures utilized with these pediatric patient populations. Evidence based practice and clinical practice guidelines in pediatric physical therapy will be discussed and compared to adult physical therapy practice. The student will be expected to demonstrate an understanding of how physical therapy assessment and intervention strategies must be adapted to meet the unique needs and settings of the pediatric population. Students will be introduced to prevention and long term management of chronic impairments and loss of function across development. Topic content will be provided in seminar form with a short lecture followed by discussion and group work. Students will apply content extensively to case studies to demonstrate integration within the cognitive and psychomotor domains of learning.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8147. Clinical Pain Sciences. 1 Credit Hour.
One in five individuals within the United States live with chronic pain. Physical therapists are well positioned to take a leading role in addressing the societal and individual burden of chronic pain. This course will equip the physical therapy student with contemporary knowledge and critical thinking to enhance their understanding, assessment, and management of patients with complex and persistent pain disorders. Using a combination of lecture and group discussions/activities this course will build upon foundational knowledge from physiology, neuroscience, psychosocial issues, bioethics, and the clinical management course series. The course will emphasize a person-centered assessment process using a biopsychosocial framework. Students will learn the clinical application of non-invasive, conservative management strategies including: pain education, self-management principles, cognitive behavioral techniques, and graded motor imagery.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8148. Assistive Technologies. 2 Credit Hours.
This course represents a transitional learning experience for the third year student by allowing for the synthesis of clinical knowledge learned during the first two years of the DPT curriculum with technology meeting the needs of the International Classification of Functioning, Disability and Health (ICF) model. The student will be expected to demonstrate how patient care paradigms for the individual with a disability are not restricted to episodic care, but are tied into long term care and quality of life issues as well. The methods employed will explain to the student the concepts of AT within the traditional role of the physical therapist in assessing, prescribing, and adapting AT for mobility issues (prosthetics and orthotics). The course will also expand upon this foundation by explaining the concept of universal design and by expanding the discussion of AT to encompass such concepts as communication and cognitive aids, recreation, telerehabilitation and robotics, and most importantly, finding funding for AT. At the conclusion of the course, the student should be well prepared for the evolving role of the physical therapist to develop, maintain, and restore maximum movement, functional ability, and quality of life throughout the lifespan.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8150. Elective - Special Topics. 1.5 Credit Hour.
The physical therapy profession is a dynamic profession responding to changes in practice settings, health care policy, societal issues, and knowledge advancements. This course will cover topics that reflect current and anticipated needs in our profession that have emerged in current physical therapy practice. PHTH 8150 is an elective course for 3rd year Doctor of Physical Therapy students and is designed to contain content classified as above the standard of entry-level professional education in physical therapy. Topics offered vary across areas of specialized clinical practice and clinical research activities of departmental faculty members.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may be repeated for additional credit.

PHTH 8151. Evidence Based Practice III. 2 Credit Hours.
This is the third course in a three course sequence. This course is designed to encourage use of the principles of evidence-based practice, integrating clinical expertise, patients' preference/values, and research evidence to produce a therapeutic alliance. In this course, students will develop a clinical question based on a case scenario, search the literature for research pertaining to the question, critically appraise the research, develop a clinical bottom line, and apply the research, along with sound clinical decision making taking into account the clinical context and individual patient preferences, to the case scenario. The students will develop a capstone presentation and deliver it during the Annual Temple DPT Student Presentation Day.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8152. Elective - Musculoskeletal. 1.5 Credit Hour.
This laboratory-based experience will provide students with instruction, practice, and peer reviewed evidence concerning orthopedic manual physical therapy. This course will build upon basic techniques learned in the Musculoskeletal Management courses and address advanced clinical decision making. All of the major regions of the musculoskeletal system will be addressed including the spine and extremities. Techniques will include joint manipulation, soft tissue mobilization, and complementary exercise. All classes will be instructed by physical therapists with fellowship training in manual physical therapy.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8153. Elective - Vestibular. 1.5 Credit Hour.
This lecture-laboratory hybrid experience will provide students with instruction, practice, and peer reviewed evidence on key concepts within the arena of vestibular rehabilitation. This course will build upon basic techniques learned in the Clinical Management of Neuromuscular Conditions II course and address advanced clinical decision making required by vestibular rehabilitation-trained clinicians. The course will cover pathophysiology, epidemiology, medical and physical therapy management of vestibular and balance disorders that benefit from vestibular rehabilitation. The course will highlight a variety of topics regarding patient history, objective examination, and clinical management for a myriad of vestibular conditions, including vestibular hypofunction, benign paroxysmal positional vertigo, post-concussive syndrome, central disorders, chronic subjective dizziness, and cervicogenic dizziness, among others. An emphasis will be placed on clinical decisions for diagnosis, appropriate referral, and intervention selection. Students will also be exposed to basic diagnostic concepts regarding vestibular function testing. As part of coursework, students will design a peer-reviewed case study and complete a competency examination. All classes will be instructed by a physical therapist with advanced training in vestibular rehabilitation.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8154. Elective - Clinical Simulation. 1.5 Credit Hour.
The goal of this experience is to expose students to "real time" clinically simulated physical therapy situations where they will have to interpret or collect examination data, react to changes in patient status, perform or plan interventions, and document clinical findings and conclusions. The clinical situations will be of increasing complexity with different levels of clinical decision making. The student will be exposed to documentation strategies that match the clinical environment of the simulated case. The topic content will include preparatory paper-based case studies, the utilization of clinical simulation interactions that involve interactions with robotic simulators as well as actual standardized patients, and debriefing sessions.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8155. Elective - Pediatrics. 1.5 Credit Hour.
This elective experience will provide the third-year Doctor of Physical Therapy student with a comprehensive overview of the process of normal and pathological development from prenatal to late adolescence. The World Health Organization's International Classification of Functioning, Disability and Health - Children and Youth version (ICF/CY) will serve as the course's health classification framework. Physical therapy practice across common pediatric conditions and settings will be discussed and compared to adult physical therapy practice. This seminar experience represents a translational learning experience: taking the previously learned clinical science, assessment and interventional strategies from the first two years of the DPT program and directing them toward a specific age-defined cohort of individuals. The student will be expected to demonstrate a complex understanding of how physical therapy assessment and intervention strategies must be adapted to meet the unique needs and settings of the pediatric population. Topic content will be provided in seminar form with a short lecture followed by discussion and group work. Outside experts and experimental learning will also be utilized.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8156. Elective - Geriatrics. 1.5 Credit Hour.
A comprehensive overview of the process of healthy and pathological aging: physiology, cognition, pathology, societal interaction, and functional adaptation. This experience represents a translational learning experience: taking the previously learned clinical science, assessment and interventional strategies from the first two years of the DPT program and integrating them into a case study based learning experience to enhance the delivery of skilled services for the older adult. Emphasis will focus on the student's clinical reasoning for clients ranging from the medically complex older adult to high level healthy aging to promote a clinically excellent approach to patient care with the older adult. The student will be expected to demonstrate a complex understanding of how physical therapy assessment and intervention strategies are best applied towards the older adult with an emphasis on appropriate prescription of exercise.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8160. Special Topics - Integrated Learning Experience. 1 Credit Hour.
The course serves as a "capstone" in which students continue to develop complex clinical reasoning by using a faculty-designed critical thinking scaffold. Student groups are assigned cases designed to demonstrate systematic clinical decision making. The student groups investigate the assigned cases and respond to the corresponding questions presented with each case scenario. Each group then provides a teaching module on their case (which includes practice of psychomotor skills relevant to the case) to their peers. The course culminates in an integrated learning experience that provides an opportunity for students to self-assess and receive individual feedback on their ability to examine and evaluate a simulated patient in either an inpatient or an outpatient environment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may be repeated for additional credit.

PHTH 8161. Integrated Clinical Experience 1. 1 Credit Hour.
The Integrated Clinical Experience (ICE) 1 course is the first in a series of five. This course implements approaches to develop the clinical reasoning scaffold in patient care, while enhancing opportunities for growth of professional behaviors and peer learning. The aim of the ICE course series is to integrate concurrent didactic coursework with experiential learning activities in varying settings. The ICE 1 course emphasizes the development of the patient-therapist interaction surrounding basic clinical skills and aims to present clinical decision making strategies at a linear and beginner level. The course activities take place in simulated patient environments, clinical settings, and in the classroom and aim to foster professional behavior, communication, and patient interaction skills. Guided self-reflection is utilized to illustrate the interactions within the reasoning process, appropriate for students at this beginning level. Students perform self and peer reflection within learning activities related to basic skill development occurring simultaneously in the didactic curriculum. Students will be expected to act in a professional manner and practice skills learned in laboratory sessions of 1st year DPT courses during this experiential learning course. Presented clinical and simulated cases highlight typical attributes of the health condition, body structure/function, activities, and participation.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8162. Integrated Clinical Experience 2. 1 Credit Hour.
The Integrated Clinical Experience (ICE) 2 course is the second in a series of five. This course implements approaches to develop the clinical reasoning scaffold in patient care, while enhancing opportunities for growth of professional behaviors and peer learning. The aim of the ICE course series is to integrate concurrent didactic coursework with experiential learning activities in varying settings. The ICE 2 course emphasizes the development of the patient-therapist interaction surrounding basic clinical skills and aims to present clinical decision making strategies at a linear and beginner level. The course activities take place in simulated patient environments, clinical settings, and in the classroom and aim to foster professional behavior, communication, and patient interaction skills. Guided self-reflection is utilized to illustrate the interactions within the reasoning process, appropriate for students at this beginning level. Students perform self and peer reflection within learning activities related to basic skill development occurring simultaneously in the didactic curriculum, as well as skills learned across semesters in the 1st year. Students will be expected to act in a professional manner and practice skills learned in laboratory sessions of 1st year DPT courses during this experiential learning course. Presented clinical and simulated cases highlight typical attributes of the health condition, body structure/function, activities, and participation.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8163. Integrated Clinical Experience 3. 1 Credit Hour.
The Integrated Clinical Experience (ICE) 3 course is the third in a series of five. This course implements approaches to develop the clinical reasoning scaffold in patient care, while enhancing opportunities for growth of professional behaviors and peer learning. The aim of the ICE course series is to integrate concurrent didactic coursework with experiential learning activities in varying settings. The ICE 3 course further develops patient-therapist interaction surrounding basic clinical skills and aims to present clinical decision making strategies at a linear and beginner level. The course activities take place in simulated patient environments, clinical settings, and in the classroom and aim to foster professional behavior, communication, and patient interaction skills. Guided self-reflection is utilized to illustrate the interactions within the reasoning process, appropriate for students at this beginning level. Students perform self and peer reflection within learning activities related to basic skill development occurring simultaneously in the didactic curriculum, as well as skills learned across the entire 1st year didactic curriculum. Presented clinical and simulated cases highlight typical attributes of the health condition, body structure/function, activities, and participation. Students will synthesize examination and evaluation findings to expand upon the linear clinical decision-making process. This synthesis facilitates the development of an appropriate physical therapy prognosis and plan of care with a focus on the ICF model.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8164. Integrated Clinical Experience 4. 1 Credit Hour.
The Integrated Clinical Experience (ICE) 4 course is the fourth in a series of five. This course implements approaches to develop the clinical reasoning scaffold in patient care, while enhancing opportunities for growth of professional behaviors and peer learning. The aim of the ICE course series is to integrate concurrent didactic coursework with experiential learning activities in varying settings. The ICE 4 course emphasizes the integration of the ICF model and its complex interactions and aims to foster more comprehensive and multi-faceted clinical decision-making strategies. ICE 4 expands upon the foundations established during the first year based upon the concurrent body systems course work. The course activities take place in simulated patient environments, clinical settings, and in the classroom and aim to foster professional behavior, communication, and patient interaction skills. The ICE 4 course helps to further develop the framework of clinical reasoning processes and strategies, integrating material between the courses in the Fall semester of the 2nd didactic year, and between the first and second academic years. Additional complexity is incorporated into clinical scenarios and patient/client interactions that involve patient-related environmental factors such as motivation, family support, beliefs and expectations. It is the expectation that students begin to develop more complex and nonlinear clinical reasoning skills in the ICE 4 course.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8165. Integrated Clinical Experience 5. 1 Credit Hour.
The Integrated Clinical Experience (ICE) 5 course is the fifth in a series of five. This course implements approaches to develop the clinical reasoning scaffold in patient care, while enhancing opportunities for growth of professional behaviors and peer learning. The aim of the ICE course series is to integrate concurrent didactic coursework with experiential learning activities in varying settings. The ICE 5 course emphasizes the integration of the ICF model and its complex interactions and aims to foster more comprehensive and multi-faceted clinical decision-making strategies. ICE 5 expands upon the foundations established during the first year based upon the concurrent body systems course work. The course activities take place in simulated patient environments, clinical settings, and in the classroom and aim to foster professional behavior, communication, and patient interaction skills. The ICE 5 course helps to further develop the framework of clinical reasoning processes and strategies, integrating material between courses in the Spring semester of the 2nd didactic year, across semesters in the 2nd didactic year, and between the first and second academic years. Additional complexity is incorporated into clinical scenarios and patient/client interactions that involve patient-related environmental factors such as motivation, family support, beliefs and expectations. At the end of the ICE 5 course, students should demonstrate readiness to enter the full-time clinical education curriculum.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 8531. Pro Bono Clinical Practice. 0 Credit Hours.
This elective course provides students actively enrolled in a health/health care program with opportunities to practice and learn new clinical skills from licensed community-based practitioners in their respective fields who will serve as their clinical mentors. Students have the opportunity to apply knowledge and skills that they are currently learning in a real practice setting. The clinical services are delivered in the College of Public Health's North Broad Physical Therapy Center which is a pro bono clinic providing health and health care services to individuals who are uninsured, under-insured, or do not have the financial means to make their copays. The Center emphasizes the importance of inter-professional education and collaboration for students in the College of Public Health and the Schools of Medicine and Pharmacy.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: College of Public Health, Medicine, Lewis Katz School, Pharmacy, Social Work.

Repeatability: This course may be repeated for additional credit.

PHTH 8552. Clinical Management of Musculoskeletal Conditions III. 3 Credit Hours.
The third musculoskeletal management course emphasizes advanced clinical decision making and integration of material from across the curriculum, body systems, and lifespan. Selected areas of the upper and lower quarter regions of the musculoskeletal systems are reviewed and updated. Special topics such as management of chronic pain, work-related musculoskeletal disorders, injury prevention, complex regional pain syndrome, and temporomandibular joint disorders are also covered.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 8557. Management of Physical Therapy Practices. 3 Credit Hours.
This course covers a transitional learning experience for the third-year student by allowing the synthesis of clinical knowledge learned during the first two years of the D.P.T. curriculum with an administrative and procedural framework. The student is expected to demonstrate an understanding of how patient care paradigms can meld with the parameters of reimbursement, compliance, management hierarchy, and regulatory issues while allowing for individual and group therapist growth. The capstone project entails the students providing a local physical therapy clinical department with real-time assistance on a management issue germane to that department. The students are expected to meet with the assigned clinical staff, collect data, research the management issue, and provide a reasonable and effective solution utilizing evidenced-based practice guidelines where acceptable.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 8571. Phys Therapy Diagnostics. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8572. Clinical Pharmacology. 1.5 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8573. Diagnostic Imaging. 1.5 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8574. Ethics. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8575. Motor Contrl & Human Mov. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8576. Clinical Decision Making. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8577. Health Care System. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8578. Outcome Meas Epidemiolog. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8579. Teaching and Learning. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Transitional-DPT.

Repeatability: This course may not be repeated for additional credits.

PHTH 8581. MsIskIt Mgt I Residency. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 8582. MsIskIt Mgt II Residency. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9085. Mentorship I Residency. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9086. Mentorship II Residency. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9185. Clinical Experience 1. 8 Credit Hours.
This course is designed as a full-time clinical internship. The clinical experience takes place at an off campus clinical site with coordination by the Director of Clinical Education. The students will have the opportunity to problem solve and utilize their clinical decision making skills in examining, evaluating, assessing and developing plans of care for varied patient populations as per the objectives of the course.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 9285. Clinical Experience 2. 4 Credit Hours.
This course is designed as a full-time clinical internship for each student and takes place over the course of 12 weeks. This course requires placement at an off-campus clinical site with coordination from the Director of Clinical Education. The students will have the opportunity to problem solve and utilize their clinical decision making skills in examining, evaluating, assessing and developing plans of care for varied patient populations as per the objectives of the course.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may be repeated for a total of 8 credit.

PHTH 9385. Clinical Experience 3. 8 Credit Hours.
Clinical Experience 3 is the third and final full-time clinical experience occurring after all didactic content has been delivered. The Clinical Experience 3 is twelve weeks in length. The affiliation typically takes place off site and is coordinated, managed, and overseen by the Director of Clinical Education. The students will have the opportunity to problem solve and utilize their clinical decision making skills in examining, evaluating, assessing and developing plans of care for varied patient populations as per the objectives of the course. Students will be supervised in an affiliating clinical facility by a licensed physical therapist, using an experiential teaching format. Students will have the opportunity to work and learn in a physical therapy setting, and have the opportunity to integrate classroom didactic information with practical hands-on clinical experience. The student will have exposure to patient care, have the opportunity for clinical learning and teaching, administration, observation and/or participation in research, and practice and adopt professional socialization skills. Instructional methods will include online asynchronous Canvas assignments and onsite clinical practical experience.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Physical Therapy.

Repeatability: This course may not be repeated for additional credits.

PHTH 9620. Human Movement Science I: Neural Factors. 3 Credit Hours.
Current theories and research pertaining to the neural mechanisms of motor control and sensorimotor integration are introduced as a foundation for the evaluation and treatment of movement and balance deficits. Studies involving lesions of the nervous system are discussed to demonstrate the impact of neural impairments on motor performance and motor learning. The course also introduces the neurophysiologic methods to evaluate the relationship between neural circuitry and human movement (e.g., MRI, EEG, single unit recording, and PET).

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9621. Human Movement Science III: Cognition and Learning. 3 Credit Hours.
A survey of theory and research concerning the cognitive processes of the human brain and motor behavior is conducted. Emphasis is on the developmental changes that underlie cognition as they relate to motor behavior. These objectives are approached by examining lifespan motor development and learning, attentional mechanisms, perceptual effects on motor output, implicit and procedural memory effects on motor control, automatic compensatory responses and/or strategies following injury or disease, and adaptation to long- and short-term changes in the body or environment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9622. Instrumentation and Motion Analysis. 3 Credit Hours.
Current methodology appropriate to the study of normal and abnormal human movement is presented. Both technical and theoretical foundations of instrumentation use are included. Students have opportunities to develop skills in data acquisition, reduction, and analyses in the laboratory sessions.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9623. Atypical Human Movement. 3 Credit Hours.
An exploration of the theoretical perspectives used to interpret movement dysfunctions. Topics include overuse, developmental regression, limited repertoires, and external and internal constraints. Required for Ph.D. students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
PHTH 9620|May not be taken concurrently.

PHTH 9624. Human Movement Science II: Mechanics and Models. 3 Credit Hours.
Application of the mechanical principles to static and dynamic models of human posture and movement and of the mechanical properties of the link-segment systems and biological tissues are introduced in this course. Dynamical systems framework are introduced as a basis for understanding the organization of complex movement patterns. Other systems, computational, and statistical models that are commonly used to analyze and describe the mechanisms of human posture and movement are discussed. Interpretation of the model predictions is based on healthy individuals in addition to those with movement deficits.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9625. Clinical Decision Making. 3 Credit Hours.
A survey of theory and research concerning the cognitive processes of the human brain and motor behavior is conducted. Emphasis is placed on the developmental changes that underlie cognition as they relate to motor behavior. These objectives are approached by examining lifespan motor development and learning, attentional mechanisms, perceptual effects on motor output, implicit and procedural memory effects on motor control, automatic compensatory responses and/or strategies following injury or disease, and adaptation to long- and short-term changes in the body or environment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9626. Musculoskeletal Impairment: Evidence for Examination and Intervention Strategies. 3 Credit Hours.
Review of evidence from refereed literature and from expert clinical practice that supports reliability, validity, and utility of examination and intervention techniques used in the physical therapy management of patients with musculoskeletal impairment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9627. Movement Sci & Cognitive. 3 Credit Hours.
Current theories pertaining to the control of movement and posture are reviewed as a foundation for the evaluation and treatment of movement and balance dysfunction. Required for Ph.D. students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9645. Advanced Musculoskeletal Anatomy. 3 Credit Hours.
Advanced cadaver dissection and study. Students must have a basic understanding of human anatomy and cadaver dissection. The course integrates clinical and anatomical perspective of the human body. Individual projects are planned by each student.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9651. Theoretical Foundations of Physical Therapy. 3 Credit Hours.
This course examines theories that underlie the discipline of Physical Therapy. Topics include neuronal regeneration, balance control, motor development, cumulative trauma disorders, health services research and expertise in clinical practice. Students examine empirical evidence that supports or refutes each theory. Required for Ph.D. in PT students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
PHTH 9620|May not be taken concurrently.

PHTH 9653. Research Strategies. 3 Credit Hours.
Research in health care practice and education. Includes critical analysis of manuscripts, experimental and nonexperimental research designs, and overview of quantitative and qualitative analyses.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9654. Laboratory Rotations and Seminar in Human Movement Science. 3 Credit Hours.
Full-time work in the laboratory of a faculty member to learn instrumentation and techniques pertinent to the area of research the student wishes to pursue. Two rotations are required for Ph.D. in PT students. Health care problems are also presented.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9655. Qualitative Research Strategies for Health Care. 3 Credit Hours.
Qualitative research focusing on grounded theory and case analysis is the subject of this course. Combining qualitative and quantitative research strategies to study health care problems is also presented.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9673. Curricular Design and Teaching in the Health Professions. 3 Credit Hours.
This course covers philosophical orientations to and alternative curricular designs for professional health care academic and clinical education, as well as theories of learning, teaching strategies, and evaluation formats. Required for Ph.D. students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9682. Independent Study. 1 to 3 Credit Hour.
This course offers individual investigation in physical therapy practice or research under the guidance of a mentor.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9687. Clinical Internship V. 9 Credit Hours.
The fifth and final full-time clinical internship takes place over the course of nine weeks. Clinical Internship V typically occurs during the spring semester of the student's third academic year. The internship takes place off-site and is coordinated by the Director of Clinical Education. This internship focuses on developing and integrating clinical skills and engaging in clinical decision-making with various patient populations. Students are evaluated by the Clinical Instructor using the APTA PT CPI Web (2006) and are expected to be at entry-level performance upon completion of this course.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9774. Administration of Health Professions Academic Programs. 3 Credit Hours.
This course examines the organization of universities with an emphasis on administration of professional graduate programs, program and faculty evaluation and development, funding, admissions, professional accreditation, clinical education, and state licensure. Required for Ph.D. students.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

PHTH 9787. Teaching Practicum. 1 to 3 Credit Hour.
Practicum in teaching in the professional physical therapy curriculum. Students contract with a faculty member for guided development, presentation and evaluation of a course segment based on principles and concepts covered in PHTH 9673.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9994. Preliminary Examination Preparation. 1 to 6 Credit Hour.
This course is limited to Ph.D. students who have completed all their coursework and are finishing qualifying examinations.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9998. Dissertation Proposal. 1 to 3 Credit Hour.
Students are expected to prepare and submit a dissertation proposal in the form of a grant proposal and successfully defend it orally before their Dissertation Committee. As appropriate, they must obtain IRB approval for their proposed research, and submit a copy of the grant proposal to the Graduate School. Students are expected to have developed and defended their dissertation grant proposal within one year of successfully completing their preliminary examination.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

PHTH 9999. Dissertation Research and Colloquium. 1 to 4 Credit Hour.
This course is limited to Ph.D. students who have passed preliminary examinations. Continuous registration in the Fall and Spring semesters is required until the oral defense has been passed. Students are required to attend a colloquium held once a month to review and discuss progress to date.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Student Attribute Restrictions: Must be enrolled in one of the following Student Attributes: Dissertation Writing Student.

Repeatability: This course may be repeated for additional credit.