# Physical Therapy and Rehabilitation Science

**Chair**
- Richard K. Shields

**Graduate degrees:** D.P.T.; M.A. in physical rehabilitation science; Ph.D. in physical rehabilitation science

**Faculty:** [Website](https://medicine.uiowa.edu/pt/profile/?appointment=PRIMARY&category=&query=&page=1&size=10)
**Website:** [https://medicine.uiowa.edu/pt/](https://medicine.uiowa.edu/pt/)

## Courses

### Physical Therapy and Rehabilitation Science Courses

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<th>Course Code</th>
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<td>PTRS:5209</td>
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<td>Human Pathology for the Physical Therapist</td>
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<td>PTRS:5235</td>
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Development and interaction within small group of interprofessional students from physical therapy, medicine, pharmacy, dentistry, nursing, and public health; deans and faculty from each college facilitate; three-hour initial session for all disciplines followed by informal monthly electronic scenarios, second formal meeting followed by informal monthly electronic discussions.

Musculoskeletal techniques and biomechanical principles applied to assessment and evaluation of common orthopedic problems of the spine; problem solving, case-study approach to clinical methods, skill acquisition.

Overview of health promotion, fitness, and wellness strategies, including information on levels of health promotion, risk assessment, applied physiology (skeletal muscle, energy metabolism, and physiological responses to exercise), exercise testing and training guidelines, body composition assessment, and development of individual weight management and exercise training programs; classroom and laboratory experiences.

Cardiorespiratory anatomy, physiology, and application of basic concepts, techniques in management of patients with acute and chronic cardiac, pulmonary disorders; laboratories.

Laboratory teaching activities that parallel the human anatomy course; observation, palpation, and problem solving skills; upper- and lower-limb, head and neck, thorax, and abdomen.

Normal and pathological movement based on understanding of muscle mechanics, segment and joint mechanics, muscle function; instructor- and student-centered learning experiences; integrative human movement system laboratories.

Students gain a cursory understanding of the physiologic mechanisms of human health and pathologic mechanisms of disease; emphasis on morphologic changes of cells and tissues, identification of causes of change (etiology), mechanisms of development (pathogenesis), and clinical manifestations of specific disease processes; influence of disease and medical diagnosis on physical therapy practice and physical therapy diagnosis.

Pathological disorders frequently encountered by physical therapists in clinical practice, addressed by physicians and health professionals who are not physical therapists; physical therapy management.

Small group case study seminars and simulated patient instructor learning experiences; clinical problems coordinated with concurrent courses; student-centered, problem-based learning format with emphasis on evidence-based practice objectives. First in a two-course sequence.
PTRS:5236 Case-Based Learning II 1 s.h.
Small-group case study seminars and simulated patient 
instruction learning experiences; clinical problems coordinated 
with concurrent courses taken in curriculum; student 
centered, problem-based learning format; emphasis on 
evidence-based practice objectives. Second in a two-part 
series of integrated courses. Prerequisites: PTRS:5235.

PTRS:5790 Integrated Clinical Education in Physical 
Therapy I 1 s.h.
Integrated clinical experiences in area physical therapy 
clinics; overview of diverse nature of practice through half-
day experiences; basic skills in examination, intervention, and 
documentation.

PTRS:5791 Integrated Clinical Education in Physical 
Therapy II 1 s.h.
Continuation of PTRS:5790; integrated clinical experiences in 
area physical therapy clinics; overview of diverse nature of 
practice through full-day clinical experiences; basic skills in 
examination, intervention, and documentation. Prerequisites: 
PTRS:5790. Requirements: Doctor of Physical Therapy 
program enrollment.

PTRS:6120 Physical Therapy Management and 
Administration I 2 s.h.
The changing U.S. health care system; physical therapy 
services across continuum of care, reimbursement to health 
care providers, mechanisms for controlling costs while 
providing quality care; clinical vignettes, small group problem 
solving.

PTRS:6121 Physical Therapy Management and 
Administration II 1 s.h.
Principles of management in physical therapy practice; 
historical perspective, current health care environment; 
business principles; marketing, managing risk, medical/legal 
concerns, professional and personal growth and development.

PTRS:6122 Psychosocial Aspects of Patient Care 1 s.h.
Emotional reactions to illness/trauma; social determinants of 
health; recognition of mental illness in physical therapy 
examination and intervention; psychosocial aspects of 
disability as they relate to patient-physical therapist 
interaction; effective communication strategies; cultural 
competence in professional behavior and patient care.

PTRS:6133 Pain Mechanisms and Treatment 1-2 s.h.
Introduction to basic science mechanisms, assessment, and 
management of pain; basic science mechanism involved in 
transmission and perception of painful stimuli after tissue 
injury, assessment and physical therapy management of pain; 
emphasis on scientific principles and published literature to 
support treatment techniques.

PTRS:6134 Physical Therapy Management of 
Integumentary System 2 s.h.
Overview of physical therapy examination and management 
of the integumentary system; wound pathology, diagnosis 
associated with the integumentary system, inflammation and 
repair, examination and reexamination techniques, 
documentation, clinical decision making, lecture and 
laboratory formats; interventions, including patient/client 
information, physical agents, electrotherapy, wound dressing.

PTRS:6143 Selected Topics in Physical Therapy 
Practice 2 s.h.
Specialty area of practice including wheelchair seating 
and prescription, pelvic health, home assessment, durable 
medical equipment (DME) recommendations, and geriatrics; 
topics dictated by changing needs of health care and the 
profession; emphasis on clinical decision making, synthesis 
and evaluation of information with respect to first-year 
physical therapy curriculum.

PTRS:6145 Interprofessional Education II: Teaching 
Neural and Musculoskeletal Evaluation Principles 1 s.h.
Active involvement in integrating anatomy, kinesiology, and 
movement control principles as applied to a select group of 
pathologies with the goal of being able to teach content area; 
reassigned student group leaders; emphasis on student 
as active learner; opportunity to teach academic areas 
previously studied in first and second years of curriculum; 
may include teaching several of these musculoskeletal 
principles in a first-year medical student anatomy course.

PTRS:6170 Management of People with Prosthetic and 
Orthotic Needs 2 s.h.
Physical therapy management and assessment of patients 
in need of prosthetic and orthotic devices; principles and 
components of prosthetic and orthotic design and use.

PTRS:6172 Radiology/Imaging for Physical 
Therapists 2 s.h.
Basic principles and procedures for acquisition and 
interpretation of radiology and imaging in clinical practice 
and research; plain film radiographs, CT, MRI, other common 
imaging modalities; case-based, multidisciplinary approach.

PTRS:6173 Differential Diagnosis in Physical 
Therapy 2 s.h.
Use of physical therapy examination and evaluation skills 
to diagnose physical therapy problems; focus on use of 
good clinical decision-making skills when analyzing a 
patient’s history and administering physical therapy tests 
and measures to confirm or rule out differential diagnoses; 
components of the medical examination; importance of 
collaboration between therapists and other health 
professionals; interactive case studies presented by clinical 
experts.

PTRS:6176 Pharmacology for Physical Therapists 3 s.h.
Contemporary pharmacology; overview of basic 
pharmacokinetic and pharmacodynamic principles; relation of 
drug therapy to therapeutic interventions provided by physical 
therapists; small group clinical case presentations.

PTRS:6200 Pediatric Physical Therapy 2 s.h.
Preparation for physical therapy practice in pediatric settings 
using interdisciplinary family-centered practice; normal and 
abnormal development, standardized assessment, service-
delivery settings, interventions, management strategies 
specific to pediatrics.

PTRS:6202 Musculoskeletal Therapeutics II 3 s.h.
Pathology, assessment, management of orthopedic disorders 
of the upper quarter; problem-solving approach to evaluation 
and management of patients with musculoskeletal conditions. 
Prerequisites: PTRS:5201.

PTRS:6203 Musculoskeletal Therapeutics III 4 s.h.
Pathology, assessment, management of orthopedic disorders 
of the lower quarter; problem-solving approach to evaluation 
and management of patients with musculoskeletal conditions. 
Prerequisites: PTRS:6202.
PTRS:6204 Progressive Functional Exercise  2 s.h.
Therapeutic exercise options (e.g., isometrics, isotonics, isokinetics, plyometrics, endurance exercises, stretching exercises) and training principles; application to functional activities, including those of daily living, work, recreation, and sport; laboratory component.

PTRS:6224 Activity-Based Neural and Musculoskeletal Plasticity in Health Care  4 s.h.
Examination of neural, muscular, and skeletal plasticity to increased and decreased use in normal and pathological states (chronic inactivity, obesity, metabolic syndromes, orthopedic and neurological injuries); principles of genetic regulation with physical activity including underlying mechanisms contributing to acute and chronic adaptations of muscle, spinal circuitry, and supra-spinal centers; integration of movement control concepts through contemporary papers evaluating short and long latency reflexes, posture and balance control, spasticity, and motor learning in individuals with acute and chronic perturbations to the nervous system.

PTRS:6225 Neuromuscular Therapeutics  3 s.h.
Evidence-based application of clinical neuroscience, motor control, and learning principles to practice of neurological physical therapy; approaches to evaluation and therapeutic intervention for clients with adult-onset neurological conditions, with emphasis on examination, developing a diagnosis, clinical decision making, and prescribing interventions that help clients accomplish goals. Prerequisites: PTRS:6224.

PTRS:6237 Community Outreach and Engagement I  1 s.h.
Outreach and engagement activities with individuals and organizations in the community; students select service learning experiences from current community partners, or may suggest their own idea, and develop their individual learning goals for these experiences; discussion and written assignments focus on reflection of student experiences with persons who are different than themselves, and on social responsibility, advocacy, and professionalism in the field of physical therapy; first in a two-course series.

PTRS:6238 Community Outreach and Engagement II  1 s.h.
Outreach and engagement activities with individuals and organizations in the community; students select from current community partners, or may suggest their own idea, and develop their individual learning goals for these experiences; discussion and written assignments focus on reflection about student experiences with persons who are different than themselves, and on social responsibility, advocacy, and professionalism in the field of physical therapy; second in a two-course series. Prerequisites: PTRS:6237.

PTRS:6250 Critical Inquiry I: Evidence-Based Practice  2 s.h.
Topics relevant to evidence-based practice and research design; identification of appropriate questions for research and clinical applications, location and evaluation of available evidence, identification of issues that affect validity of research designs, interpretation of basic statistical analyses.

PTRS:6251 Critical Inquiry II: Rehabilitation Research  2 s.h.
Experience conducting group research projects under faculty supervision; data collection and analysis, manuscript preparation, oral defense of research findings during a formal poster presentation. Prerequisites: PTRS:6250.

PTRS:6252 Critical Inquiry III: Clinical Application  1 s.h.
Principles and procedures learned in PTRS:6250 and PTRS:6251 applied to a clinical setting; students write and present a case report with an evidence-based practice focus, using a clinical case from their final internships. Prerequisites: PTRS:6251. Requirements: Physical Therapy and Rehabilitation Science program enrollment.

PTRS:6253 Functional Neuroanatomy  arr.
Basic principles of neuroanatomy and neurophysiology; emphasis on human central nervous system; laboratory emphasis on anatomical study of spinal cord and brain. Offered spring semesters. Requirements: physical therapy and rehabilitation science enrollment or graduate standing. Same as ACB:6252.

PTRS:6792 Integrated Clinical Education in Physical Therapy IV  1 s.h.
Two-week, full-time clinical experience in physical therapy clinics under guidance of physical therapists; theory and practice of physical therapy procedures, competence building in basic skills. Prerequisites: PTRS:6793. Requirements: Doctor of Physical Therapy Program enrollment.

PTRS:6793 Integrated Clinical Education in Physical Therapy III  3 s.h.
Six-week, full-time clinical education experience in a rural health environment. Prerequisites: PTRS:5791. Requirements: Doctor of Physical Therapy program enrollment.

PTRS:6794 Terminal Clinical Education in Physical Therapy I  arr.
Nine week, full-time clinical education experience divided among various settings; development of competence in independent examination, evaluation, and treatment of patients under supervision of clinical faculty. Prerequisites: PTRS:6792. Requirements: Doctor of Physical Therapy program enrollment.

PTRS:6795 Terminal Clinical Education in Physical Therapy II  4 s.h.
Nine-week, full-time clinical education experience divided among various settings; development of competence in independent examination, evaluation, and treatment of patients under supervision of clinical faculty. Prerequisites: PTRS:6794. Requirements: Doctor of Physical Therapy program enrollment.

PTRS:6796 Terminal Clinical Education in Physical Therapy III  4 s.h.
Nine-week, full-time clinical education experience divided among various settings; development of competence in independent examination, evaluation, and treatment of patients under supervision of clinical faculty. Prerequisites: PTRS:6795. Requirements: Doctor of Physical Therapy program enrollment.

PTRS:7812 Biomedical Instrumentation and Measurement  3 s.h.
Introduction to biomedical instrumentation and measurement; understanding sources of error and noise in biomedical research applications; basic circuit analysis, calibration of measurement tools, A/D conversion, digital filtering; lab components. Offered fall semesters of even years.

PTRS:7820 Seminar in Rehabilitation Science  1 s.h.
Exploration of research related to rehabilitation science; lectures by faculty, graduate students, and guest scholars with expertise in areas relevant to rehabilitation science (e.g., neuroscience, physiology, medicine, engineering, pharmacology, integrated physiology).
PTRS:7826 Scientific Writing in Rehabilitation Science 2 s.h.
Knowledge of and experience related to scientific writing, critical review of scientific literature, publication in the biomedical sciences, thesis/dissertation writing, grant writing, scientific presentation, writing used in academic and scientific careers.

PTRS:7875 Analysis of Activity-Based Neural and Musculoskeletal Plasticity 3 s.h.
Examination of neural, muscular, and skeletal plasticity to increased/decreased use in normal and pathological states (chronic inactivity, obesity, metabolic syndromes, orthopedic and neurological injuries); genetic regulation with physical activity and underlying mechanisms contributing to acute and chronic adaptations of muscle, spinal circuitry, and supraspinal centers; integration of movement control concepts through contemporary papers evaluating short and long latency reflexes, posture and balance control, spasticity, and motor learning in individuals with acute and chronic perturbations to the nervous system; individual research projects.

PTRS:7880 Teaching Practicum arr.

PTRS:7884 Practicum in Research arr.
Laboratory experiences connected with investigative process; individual instruction, observation, activities in methodological development, data acquisition, data analysis aspects of research.

PTRS:7895 Advanced Seminar in Rehabilitation Science arr.
Current status of research for biological, mechanical, psychological components pertinent to cardiopulmonary, musculoskeletal, neuromuscular areas of rehabilitation science; preparation for comprehensive exam.

PTRS:7899 Introduction to Pain: Overview of Theories, Concepts, and Mechanisms 1 s.h.
Overview of pain concepts and mechanisms; general overview of pain, models of pain, peripheral and central mechanisms, and pain inhibition. Requirements: prior neuroscience course.

PTRS:7900 Rehabilitation Research Capstone Project arr.
Specific phases of the research process; development of a research question and associated hypotheses, collection and analysis of data, interpretation and discussion of the information’s meaning; presentation to sponsoring mentor’s laboratory/program, and written document.

PTRS:7901 Clinical Correlates of Pain: Syndromes and Management 1 s.h.
Common pain conditions and management of pain using an interdisciplinary focus; lectures by University of Iowa Hospitals and Clinics clinicians on a variety of acute and chronic pain conditions and management approaches. Requirements: prior neuroscience course.

PTRS:7902 Molecular, Cellular, and Neural Mechanisms of Pain 2 s.h.
Basic science mechanisms of pain and pain modulation; understanding molecular basis for pain in nociceptive afferents (peripheral sensitization), underlying molecular and neuronal mechanisms of central processing of pain (central sensitization), cortical pain processing, animal and human experimental pain models; readings from past and current literature. Prerequisites: PTRS:7899. Requirements: prior neuroscience course.

PTRS:7903 Rehabilitation Management of Pain 1 s.h.
Basic principles of rehabilitation for pain control including education, exercise, and electrophysical modalities; evidence-based approach to rehabilitation covering mechanisms of action and clinical effectiveness; case studies. Prerequisites: PTRS:7899 and PTRS:7901.

PTRS:7925 Independent Study arr.
Problem-solving experience in physical therapy; commensurate with student’s interest, ability.

PTRS:7927 Research in Rehabilitation Science arr.
Placement of physical therapy on sound scientific base; therapy; initiation, refinement, establishment of methods in physical therapy evaluation, treatment; direct clinical and laboratory approach, philosophical treatise, or research proposal.

Problem solving experience in neuro-mechanical systems, commensurate with student interest, ability.

PTRS:7931 Critical Thinking in Pain arr.
Problem solving experience in pain, commensurate with student interest, ability.

PTRS:7932 Critical Thinking in Biomechanics and Human Performance Assessment arr.
Problem solving experience in biomechanics and human performance assessment, commensurate with student interest, ability.

PTRS:7933 Critical Thinking in Activity-Based Plasticity arr.
Problem solving experience in movement control/human performance, commensurate with student interest, ability.

PTRS:7934 Critical Thinking in Neural Plasticity arr.
Problem solving experience in neural plasticity, commensurate with student interest, ability.

PTRS:7935 Critical Thinking in Movement Science arr.
Problem solving experience in movement science, commensurate with student interest; ability.

PTRS:7936 Critical Thinking in Cardiovascular Physiology arr.
Problem solving experience in cardiovascular physiology, commensurate with student interest, ability.