Physical Therapy and Rehabilitation Science

Chair

Richard K. Shields

Graduate degrees: DPT; MA in physical rehabilitation science; PhD in physical rehabilitation science

Faculty: https://pt.medicine.uiowa.edu/our-people

Website: https://pt.medicine.uiowa.edu/

Physical therapists provide services to people with and without impairments, functional limitations, disabilities, or pain from activity, age, injury, disease, and/or surgery. The mission of the Department of Physical Therapy and Rehabilitation Science is to prepare a clinical and scientific workforce that leads patients, health systems, and a diverse society toward greater health. The department achieves this mission by cultivating excellence in education and clinical practice, discovering and disseminating new knowledge, and developing leaders who serve the profession and society.

The department's guiding principles are articulated through their priorities, focusing on creative people, operational efficiency, innovative discovery, and offering a high-value education. Their team of faculty, staff, and students use these priorities to organize and develop annual goals and strategies to address rapid changes in education, research, and healthcare. These priorities are designed to stimulate continual reflection and discussion about present and future needs to advance the profession, University of Iowa Health Care, the Carver College of Medicine, and the University of Iowa. The Department of Physical Therapy and Rehabilitation Science is located in the Carver College of Medicine on the University of Iowa health sciences campus.

Programs

Graduate Programs of Study

- Master of Arts in Physical Rehabilitation Science
- Doctor of Physical Therapy
- Doctor of Philosophy in Physical Rehabilitation Science

Facilities

The department has state-of-the-art independent research laboratories and is well-equipped for classroom and laboratory instruction and innovative research. The department's state-of-the-art research facilities include the Movement and Rehabilitation Laboratory and a spinal cord research laboratory at University of Iowa Health Care, the Human Movement Control/Performance Laboratory, the Neurobiology of Pain Laboratory, the Neuromuscular Biomechanics Laboratory, the Human Integrative and Cardiovascular Physiology Laboratory, the Applied Neuroplasticity Laboratory, the Human Performance and Clinical Outcomes Laboratory, and the Movement, Imaging, and Rehabilitation Laboratory.

Courses

Physical Therapy and Rehabilitation Science Courses

PTRS:5100 Professional Issues and Ethics 1 s.h.
Contemporary issues in clinical practice and professional development; legal and ethical perspectives on human rights, ethical theory and principles for analyzing and acting on ethical problems; professional and peer relationships.

PTRS:5101 Introduction to Physical Therapy Practice 2 s.h.
Professional development of physical therapists; evolution of profession; analysis of current role in health care and public health with respect to societal health challenges; patient management terminology including medical terminology and language utilized in the *Guide to Physical Therapist Practice*; concepts of enablement models and disablement models, including World Health Organization's *International Classification of Functioning, Disability and Health* model in the biopsychosocial model of health; introduction to evidence-based practice principles.

PTRS:5102 Principles of Physical Therapy I 2 s.h.
Patient management skills: fostering therapeutic alliance, history taking, systems review, positioning, draping, transfers, body mechanics, assisted gait, wheelchairs, and negotiation of architectural barriers.

PTRS:5103 Principles of Physical Therapy II 2 s.h.
Continuation of PTRS:5102; expansion of existing skills and provides new learning experiences in documentation, assessment of joint range of motion/goniometry, manual muscle testing, preambulatory intervention strategies, gait analysis; musculoskeletal, neuromuscular, and integumentary systems review. Prerequisites: PTRS:5102.

PTRS:5131 Therapeutic Physical Agents 2 s.h.
Theoretical and practical applications for safe, effective use of physical agents (superficial and deep heat, cold, hydrotherapy), electrotherapeutic modalities (biofeedback, NMES, TENS, iontophoresis); massage and soft tissue mobilization; emphasis on problem solving, clinical decision-making.

PTRS:5144 Interprofessional Education I: Team-Based Approach to Health Care 1 s.h.
Learn the foundations of interprofessional, team-based health care practice; orientation to interprofessionalism and population health; learn about peer professions and process a simulated patient case. Assignments provide opportunities for reflection on professional roles and interprofessional teamwork.

PTRS:5201 Musculoskeletal Therapeutics I 3 s.h.
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.

PTRS:5205 Health Promotion and Wellness 3 s.h.
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.

PTRS:5206 Cardiopulmonary Therapeutics 3 s.h.
Cardiorespiratory anatomy, physiology, and application of basic concepts, techniques in management of patients with acute and chronic cardiac, pulmonary disorders; laboratories.

PTRS:5209 Surface Anatomy 1 s.h.
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.

PTRS:5210 Kinesiology and Pathomechanics 4 s.h.
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.

PTRS:5212 Human Pathology for the Physical Therapist 3 s.h.
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.

PTRS:5215 Applied Clinical Medicine 2 s.h.
Pathological disorders frequently encountered by physical therapists in clinical practice, addressed by physicians and health professionals who are not physical therapists; physical therapy management.

PTRS:5235 Case-Based Learning I 1 s.h.
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 instructor 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: Communication, Teaching, and Learning 1 s.h.
Practical skills for effective communication, teaching, and learning in contemporary interprofessional practice. Learning experiences include workshop-based training in teaching, culminating in opportunities to teach functional anatomy to year-one medical students. Hone therapeutic communication skills, including patient education, and work as teams to select and administer appropriate neuromusculoskeletal examination techniques. Interact with clinicians from peer professions; explore fundamentals of co-treatment and effective interprofessional communication.

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 pharmokinetic 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 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: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 Measurement, Rigor, and Reproducibility 3 s.h.
Advanced, applied instruction in measurement as a foundation for rigorous and reproducible research; topics include sources of systematic and random measurement error, signal acquisition and processing, calibration, and experimental design strategies to minimize bias and improve data quality; principles of validity, reliability, and data interpretation across a wide range of biological, physiological, and behavioral research contexts.

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 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; individual research projects.

PTRS:7880 Teaching Practicum arr.
Individual instruction, observation, experimentation in teaching, guidance, analysis of evaluation processes in Physical Therapy and Rehabilitation Science.

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: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.

PTRS:7930 Critical Thinking in Neuro-Mechanical Systems arr.
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.

PTRS:7990 Thesis: Rehabilitation Science **arr.**
Investigative process: formulation of problem, literature search and analysis, procedure for collecting data, data analysis, organization and writing of thesis proposal, thesis.