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: https://medicine.uiowa.edu/pt/people/primary-appointments
Website: https://medicine.uiowa.edu/pt/

Physical therapists provide services to patients and clients who have impairments, functional limitations, disabilities, pain, or changes in physical function resulting from injury, disease, or other causes. Physical therapists practice and collaborate with a variety of health professionals. In the area of health promotion and wellness, they provide screening examinations, prescribe fitness programs, and educate the public regarding healthy lifestyles. Research, teaching, consultation, and administration also are parts of a physical therapist's professional role.

The Department of Physical Therapy and Rehabilitation Science is located in the Carver College of Medicine on the University of Iowa health sciences campus, which includes University of Iowa Hospitals and Clinics, one of the nation’s largest university-owned teaching hospitals. Students have access to faculty members in the basic sciences and medicine, basic sciences courses, clinical specialty expertise, and innovative learning experiences associated with a medical college environment.

Programs

Graduate Programs of Study

Majors
- Doctor of Physical Therapy
- Master of Arts in Physical Rehabilitation Science
- 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 Orthopedic Gait Analysis Laboratory and a spinal cord research laboratory at University Hospitals and Clinics; the Human Movement Control/Performance Laboratory; the Neurobiology of Pain Laboratory; the Neuromuscular Biomechanics Laboratory; the Human Integrative and Cardiovascular Physiology Laboratory; and the Applied Neuroplasticity Laboratory.

Courses

Physical Therapy and Rehabilitation Science Courses

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<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tr>
<td>PTRS:5100</td>
<td>Professional Issues and Ethics</td>
<td>1 s.h.</td>
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<td></td>
<td>Evolution of physical therapy and rehabilitation science as a profession; contemporary issues in education and practice; ethical theory and approaches to analyzing and acting on ethical problems; professional and peer relationships.</td>
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<tr>
<td>PTRS:5101</td>
<td>Introduction to Physical Therapy Practice</td>
<td>2 s.h.</td>
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<td>Lectures, case presentations, and group activities using the Guide to Physical Therapist Practice; elements of the patient/client management model, concepts of the disablement model, preferred practice patterns as applied in clinical problems; importance of professionalism, professional socialization; introduction to evidence-based practice; competence in medical terminology.</td>
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<tr>
<td>PTRS:5102</td>
<td>Principles of Physical Therapy I</td>
<td>2 s.h.</td>
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<td>Patient management skills: interviewing, medical history taking, vital signs, positioning, draping, transfers, body mechanics, assisted gait, wheelchairs, and negotiation of architectural barriers.</td>
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<tr>
<td>PTRS:5103</td>
<td>Principles of Physical Therapy II</td>
<td>2 s.h.</td>
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<td>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.</td>
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<tr>
<td>PTRS:5131</td>
<td>Therapeutic Physical Agents</td>
<td>2 s.h.</td>
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<td>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.</td>
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<td>PTRS:5144</td>
<td>Interprofessional Education I: Team-Based Approach to Health Care</td>
<td>1 s.h.</td>
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<td>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.</td>
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<tr>
<td>PTRS:5201</td>
<td>Musculoskeletal Therapeutics I</td>
<td>3 s.h.</td>
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<td>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.</td>
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<tr>
<td>PTRS:5205</td>
<td>Health Promotion and Wellness</td>
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<td>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.</td>
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and patient treatment; importance of holistic health care.

Cultural competence in professional behavior or chronic-pain patient; complementary roles of other health interaction; specific problems of the angry, non-compliant, of disability as they relate to patient-physical therapist.

Emotional reactions to disability, psychosocial aspects

PTRS:6122 Psychosocial Aspects of Patient Care 1 s.h. Concerns, preparing for the future.

Business principles; marketing, managing risk, medical/legal historical perspective, current health care environment; Principles of management in physical therapy practice; Administration II 1 s.h.


Therapy services, reimbursement to health care providers, The changing U.S. health care system; access to physical.

Administration I 2 s.h.


Continuation of PTRS:5790; integrated half-day clinical experiences. Prerequisites: PTRS:5790.

PTRS:6119 Radiology/Imaging for Physical Therapy II 1 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  
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  
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  
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  
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 Care  
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  
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 Service Learning I  
Service-learning work experience with community partners; students develop individual learning goals for these experiences; classroom reflection on service activities, experiences with elderly and/or disabled, and social responsibility, advocacy, and professionalism in physical therapy; written reflection assignments. First in a two-course sequence. Prerequisites: PTRS:6237.

PTRS:6238 Service Learning II  
Service-learning work experience with community partners; students develop individual learning goals for these experiences; classroom reflection on service activities, experiences with elderly and/or disabled, and social responsibility, advocacy, and professionalism in physical therapy; written reflection assignments. Second in a two-course sequence. Prerequisites: PTRS:6237.

PTRS:6250 Critical Inquiry I: Evidence-Based Practice  
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  
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  
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  
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  
Two-week, full-time clinical experience in physical therapy clinics in Iowa, under guidance of physical therapists; theory and practice of physical therapy procedures, competence building in basic skills. Prerequisites: PTRS:6793.

PTRS:6793 Integrated Clinical Education in Physical Therapy III  
Six-week, full-time clinical education experience with focus on acute, skilled, long term, or geriatric care in a general hospital, skilled nursing facility, long term care center, or home health setting. Prerequisites: PTRS:5791. Requirements: Doctor of Physical Therapy program enrollment.

PTRS:6794 Terminal Clinical Education in Physical Therapy I  
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  
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  
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.
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.

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).

Scientific Writing in Rehabilitation Science 3 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.

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.

Teaching Practicum arr.

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

Biomechanical Analysis in Rehabilitation 3 s.h.
Assessment of pathological movement through human movement analysis techniques, including link segment modeling and analysis, mechanical energy and power analysis, electromyography and muscle modeling.

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.

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.

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.

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.

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.

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.

Independent Study arr.
Problem-solving experience in physical therapy; commensurate with student's interest, ability.

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.

Critical Thinking in Neuro-Mechanical Systems arr.
Problem solving experience in neuro-mechanical systems, commensurate with student interest, ability.

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

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

Critical Thinking in Movement Control/Human Performance arr.
Problem solving experience in movement control/human performance, commensurate with student interest, ability.

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

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

PTRS:7990 Thesis: Rehabilitation Science

PTRS:8133 Introduction to Human Pathology for Graduate Students
4 s.h.
Human disease; basic disease processes, organ-related and multisystem diseases; case analysis. Offered fall semesters. Same as PATH:8133.