



UNIVERSITY OF
SOUTH CAROLINA
Arnold School of Public Health

Doctor of Philosophy (PhD) in Exercise Science specializing in Rehabilitation Sciences

Overview- PhD in Division of Rehabilitation Sciences

The Ph.D. program is designed to prepare students for research careers in the study of Rehabilitation Sciences. Graduates are trained for entry into positions for universities, colleges, research institutes, research-oriented governmental settings, and research-oriented clinical settings.

Upon successful completion of this program, the graduate will be able to function as an independent researcher competent in designing, implementing, analyzing, and disseminating original research. In addition, the graduate will be prepared to teach as a productive faculty member at the undergraduate, graduate, and professional level.

General Information- PhD in Division of Rehabilitation Sciences

The faculty of the *Division of Rehabilitation Sciences* includes individuals with a wide variety of research expertise, teaching experience, and clinical backgrounds in rehabilitation and motor behavior. The research programs in the division address many areas of scientific inquiry including:

- Evidence-based practice and outcomes in physical therapy and rehabilitation
- Optimization of rehabilitation after stroke and brain injury
- Neural and behavioral basis of motor control and motor learning
- Posture-balance-gait-mobility in older adults and special populations
- Epidemiology, assessment, and treatment of musculoskeletal pain syndromes
- Biologic basis for musculoskeletal pain
- Development of quantitative assessment tools for gaze-motor control, eye-hand coordination, and visual cognition
- Robotic assessment of sensorimotor development in children, adolescents, athletes and individuals with neurological insult
- Enhancing neurorehabilitation using non-invasive brain stimulation
- Physical activity and its role in recovery of function after disease and trauma in older adults
- Patient satisfaction with care
- Health services utilization

Upon entrance into the program, students meet with their primary advisor in the Division of Rehabilitation Sciences to outline a plan of study, research interests, and professional goals. Students complete a yearly updated plan of study and meet with the primary advisor to review progress regarding academic, research and professional goals. Students are required to be involved in ongoing research in the division upon entering the doctoral program. Opportunities to present individual research, ideas for future research, and to become aware of ongoing research are provided through (a) a weekly Seminar Series in the Department of Exercise Science and (b) a weekly seminar series

organized through the Physical Therapy Program. The PhD curriculum includes coursework in exercise science, research design, statistics, motor control, independent study, and dissertation hours. Electives from areas such as physical therapy, medicine, exercise science, neuroscience, psychology, health promotion, and epidemiology are encouraged. Students are also given opportunities to teach in different classroom settings to prepare them for future faculty roles. **Both the Graduate School and the Department of Exercise Science regulations will govern this degree.**

Post DPT -PhD Option

Faculty of the Physical Therapy Program and the Department of Exercise Science at the University of South Carolina have combined to offer students who have graduated from an accredited DPT program with a unique opportunity to complete a research-based PhD in Exercise Science with a specialization in Rehabilitation Sciences, Health Aspects of Physical Activity, or Applied Physiology. The Post DPT- PhD Option is designed to provide an educational avenue for the physical therapist who wants to pursue a career in the academic environment and conduct research in the area of rehabilitation, health aspects of physical activity, or applied physiology. Graduates with this degree will be prepared to fulfill the current demand for physical therapists to conduct clinically-based research and teach at the university level.

Only students with a DPT degree are eligible for admission. Applicants **must** meet the entry requirements of the PhD in Exercise Science, be approved for admission by the faculty the Department of Exercise Science, and be approved into the PhD degree by the faculty of the Rehabilitation Sciences Divisions. Admission to the post DPT- PhD under these guidelines requires that **the applicant secure a South Carolina licensure as a physical therapist within the first semester of enrollment.**

Curriculum Requirements- PhD in Division of Rehabilitation Sciences

Students and their major advisor develop a program of study designed to meet the focus of the specialization and the professional objectives of the student. This program of study must be approved by the student's advisement committee and the Graduate School. The program of study must meet the basic program requirements for the PhD degree which include:

- The PhD requires an approved program of study of 60 hours beyond the baccalaureate degree. Students with a master's degree or DPT may complete the PhD by completing a **minimum of 30 credit hours** additional credit (this includes 12 hours of dissertation).
- The student's graduate academic record must meet the minimum core requirements which include:
 - Exercise Science or a specific area of emphasis (12 hours)
 - Statistics and research design* (6 hours)
 - Dissertation (12 hours)
 - Additional elective courses designed to develop a specialization in the area of Rehabilitation Sciences. †

Electives are to be completed in the student's specific area or emphasis. The program of study is developed by the student in consultation with his/her advisor and the Division faculty and must

conform to requirements described in the Handbook for Graduate Students in Exercise Science. The program must be approved by the student's advisor and the Division faculty. Students may fulfill the statistics and research design requirements through any of the following: biostatistics, epidemiology, psychology, statistics, education, or other approved courses. The choice is contingent upon student interests and emphases and should be approved by the advisor.

Sample Rehabilitation Sciences Options

The courses listed below are not exhaustive and can be supplemented with other courses approved by the faculty advisory committee.

Exercise Science

EXSC 563 (3) – Physical Activity and the Dimensions of Aging
EXSC 695 (3) – Writing and Presentation in Research
EXSC 731 (3) – Mechanisms of Motor Skill Performance I
EXSC 700 (3)* – Physical Activity and Health: Epidemiology, Research and Practice
EXSC 710 (3) – Behavioral Aspects of Physical Activity
EXSC 742 (1) – Clinical Exercise Testing
EXSC 743 (1) – Laboratory Measurements for Exercise Testing
EXSC 755 (3) – Special Topics in Exercise Science
EXSC 777 (3) – Endocrinology in Exercise and Health
EXSC 778 (3) – Exercise and Childhood Obesity
EXSC 780 (3) – Physiology of Exercise
EXSC 781 (3) – Physiology, Exercise and Disease
EXSC 783 (1) – Research Seminar in Exercise Science
EXSC 787 (3)* – Research Methods and Design for Exercise Science
EXSC 790 (1-3) – Independent Study
EXSC 831 (3) – Mechanisms of Motor Skill Performance II
EXSC 882 (3)* – Physical Activity and Health: Epidemiology and Research Methods
EXSC 899 (1-12) Dissertation Preparation

Physical Therapy (considered as EXSC hours)

PHYT 782 (4) – Functional Anatomy
PHYT 788 (3)* – Evidence Based Practice in Physical Therapy
PHYT 808 (3) – Neural Repair and Rehabilitation

Biostatistics

BIOS 700 (3)* – Introduction to Biostatistics
BIOS 754 (3)* – Discrete Data Analysis
BIOS 757 (3)* – Intermediate Biometrics
BIOS 758 (3)* – Advanced Biometrics
BIOS 759 (3)* – Biostatistical Methods for Rates and Proportions
BIOS 760 (3)* – Biostatistical Methods in Clinical Trials
BIOS 770 (3)* – Longitudinal Data Analysis
BIOS 805 (3)* – Categorical Data Analysis
BIOS 820 (3)* – Bayesian Biostatistics and Computation

Epidemiology

EPID 700 (3)* – Introduction to Epidemiology
EPID 701 (3)* – Concepts and Methods of Epidemiology
EPID 741 (3)* – Epidemiological Methods I
EPID 800 (3)* – Epidemiological Methods II
EPID 802 (3)* – Advanced Analytical Methods in Epidemiology

Psychology

PSYC 507 (3)† – Cognitive Neuroscience
PSYC 571 (3)† – Cognitive Neuroscience Lab
PSYC 700 (3)† – Psychological Approaches to Gerontology
PSYC 702A (3)† – Basics of Neuroscience
PSYC 702B (3)† – Basics of Cognitive Psychology
PSYC 703A (3)† – Integration across Cognitive Psychology and Neuroscience
PSYC 703B (3)† – Integration across Dev Psych, Cogn Psychology and Neuroscience
PSYC 709 (3)* – Basic Quantitative Methods in the Analysis of Behavioral Data I
PSYC 709 (3)* – Basic Quantitative Methods in the Analysis of Behavioral Data II
PSYC 732 (3)† - Clinical Neuropsychology
PSYC 823 (3) *– Multivariate Analysis of Behavioral Data
PSYC 888 (1-6)† – Special Topics in Psychology: Eyetracking in Cognition

Physiology, Pharmacology, Neuroscience

PHPH 741 (3) †– Special Topics in Neuroscience
PHPH 745 (3)† – Neurophysiology
PHPH 750 (4)† – Fundamental Neuroscience
PHPH 751 (4)† - Fundamentals of Neuroscience II

Medicine

MEDI D700 (3)† – Health Aspects of Aging
RHAB 710 (3)† – Medical Aspects of Rehabilitation
RHAB 750 (3)† – Assistance in Adaptive Technology

Rehabilitation Counseling

RHAB 702 (3)† – Introduction to Rehabilitation Research and Assessment
RHAB 710 (3)† – Medical Aspects of Rehabilitation
RHAB 750 (3)† – Assistance in Adaptive Technology

Computer Science and Computer Engineering

CSCE 590 (3)† – Topics in IT: Human-Computer Interaction
CSCE 763 (3)† – Digital Image Processing
CSCE 768 (3)† – Pattern Recognition and Classification
CSCE 769 (3)† – Computational Structural Biology

Independent Study hours counted towards degree are limited (see Graduate Handbook).

Qualifying Exam- PhD in Division of Rehabilitation Sciences

The PhD Qualifying Exam (QE) in Rehabilitation Sciences is designed to assess the student's ability to synthesize information from a published research paper. For advancement in the PhD program in Rehabilitation Sciences, the QE must be satisfactorily passed prior to completion of 12 hours of doctoral level study. The style of the QE is up to the mentor, but the most common format is for the student to be given a published research paper in the field of Rehabilitation Sciences to review, critique and respond to in writing. Up to 4 hours is allotted for completing the QE. The completed QE is reviewed by 2-3 faculty members for content, clarity of writing, and ease of expression. Two faculty members must agree that the performance is satisfactory for the student to continue in the PhD degree. A follow-up oral examination may be required if recommended by the reviewing faculty. *Students entering with a DPT degree are exempt from the QE, as they already have a doctorate degree in a related field. Students entering the PhD program with a Masters degree must complete a QE.*

Comprehensive Exam- PhD in Division of Rehabilitation Sciences

Learning outcome: Rehabilitation Sciences Doctoral students will demonstrate the content knowledge necessary to perform research and teach in this area of expertise.

Criteria: Students will write and successfully defend a series of questions in their field of interest and study. Passing all questions for the comprehensive examination is required prior to presenting a Dissertation Proposal.

Methods: Students are to choose four faculty members to act on their comprehensive exam committee. Of these four faculty, one faculty member must be from outside of the Department of Exercise Science. The design of the comprehensive exam questions (type and number of questions) is **advisor dependent**, but must be approved by the examination committee. The questions and content of the questions are also at the discretion of the committee. Questions are generated by the chair of the committee with input from the remainder of the committee.

The following is the *recommended* template for questions, but can vary at the discretion of the committee. Students are given two 'at-home' questions. The student has 7 days to respond to the first question. When the first question is completed and submitted, the student receives the second question. Students may use any resources available to respond to the 'at-home' questions; the exception is that they cannot 'use' another person as a resource. This allows a) the faculty to test the student in a realistic setting and b) the student to potentially produce a useful project or outcome. Questions may include, but are not limited to: writing a short grant, reviewing an article, writing an article in journal format (including statistical analysis), or writing a literature review related to a topic in their area of research.

The third question can be another 'at home' question or it can be an 'in house' question to assess knowledge. If 'in house', students will have **no** access to other information while answering the question. Optional: the chair of the committee can decide if a general topic is given prior to the 'in-house' question to direct the student towards a general body of literature. Completion of the third question is followed by an oral defense of the total examination. The goal would be to schedule this within two weeks from the completion of the third question.

Results: A student's successful completion of the comprehensive exam is determined by agreement amongst the 4 committee members. The exam may be remediated in part or full based on the committee's decision. Successful completion of the comprehensive examination allows the PhD student to advance to the dissertation phase of the doctoral program.

Dissertation- PhD in Division of Rehabilitation Sciences

Students must successfully propose and defend a dissertation project approved by their dissertation committee per the University of South Carolina standards and timelines. No later than five years after the candidate has taken the comprehensive examination, he/she must present a dissertation based on research that has been approved by a committee of researchers in his/her major field. During the preparation phase of the dissertation project, any student who wishes to use University facilities or to confer with the faculty on dissertation work must be officially enrolled for credit. A minimum of 12 credits in Dissertation Preparation 899 is required of all doctoral candidates. Each candidate must successfully defend his/her dissertation before an examining committee appointed by the chair of the college or department chiefly concerned and approved by the Dean of the Graduate School. The committee is to consist of no fewer than four members, at least one of whom must be from outside the candidate's major department.