EXERCISE SCIENCE, PHD

Contact

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Doctoral students in Exercise Science join faculty members in an active community of scholarship and practice to engage in a research-based exploration of the effects of exercise on human health, disease, and performance. Students benefit from a faculty with diverse research interests, from working closely with one or more of these faculty members with whom they share research interests, and from the supporting laboratory facilities within the department.

The program grants a Ph.D. degree, and prepares students for careers involving sport, health, and human performance-related biomedical research, such as:

- Faculty positions in university departments where exercise and human physical activity have emerged as major focus areas, for example, kinesiology, nutrition, public health, and others;
- Postdoctoral positions in a variety of settings to (e.g., major universities, medical schools) for additional training in the area of expertise;
- Research positions in other settings. For example, graduates are well-suited for research careers in applied human physiology and/or human health, as exemplified by the research priorities of Federal agencies such as NASA (National Aeronautics and Space Agency), and the NIH (The National Institutes of Health), and the USARIEM (US Army Research Institute of Environmental Medicine).

The program's goals are for graduates to gain knowledge of important concepts, theoretical frameworks, and modes of inquiry in Exercise Science; and to develop the next generation of research scientists and educators in the field.

Facilities

The department houses several laboratories that support integrative research at the cellular, tissue, and whole organism level. Laboratories include:

- The Human Performance Laboratory - Conducts non-invasive assessment of vascular structure and function to explore the impact of exercise on emerging markers of cardiovascular disease risk;
- The Altitude Simulation Laboratory - Uses a human-scale, large hypoxia chamber during metabolic and/or exercise testing under simulated altitude conditions up to 20,000 feet;
- The Kinesmetrics Laboratory - with the goal of advancing knowledge of physical behavior's (e.g., sleep, sedentary behavior, and physical activity) consequences on health;
- The Clinical Research Laboratory - Utilizes metabolic testing facilities in conjunction with wet lab space to measure cardio-metabolic risk factors (e.g., insulin resistance, metabolic syndrome and type 2 diabetes) in obese populations.
- The Neuromuscular Physiology Laboratory - uses noninvasive brain stimulation and assessment of motor unit behavior to investigate changes that occur in the brain and spinal cord that impact skeletal muscle function throughout the lifespan.
- The System Motor Control and Biomechanics Laboratory - uses biomechanics equipment and neuro-stimulation techniques to examine how the musculoskeletal and nervous systems produce functional movements, as well as how these systems' functions change due to aging or diseases.
- Neural Health Research Lab- uses state-of-the-art technology to investigate the neural and muscular changes with aging, training, fatigue, disease, and more.
- Applied Cardiovascular Physiology Lab-focuses on the cardiovascular system and ways to assess large artery dysfunction using new measurement techniques in humans.

Admission and Financial Support

Prospective students with a bachelor's degree and the prerequisites listed below may apply to the Ph.D. program. These students will first complete Phase I of the program, which are the same requirements completed by master's degree students, before moving on to Phase II (see curriculum information below). Applicants who are not sure of their plans may decide to apply to the Exercise Science M.S. program, with the option to apply to the Ph.D. program toward the end of the master's degree. Those who already hold a master's degree in Exercise Science may also apply, and, depending on review of past coursework, may begin with Phase II of the program.

Applicants should have a cumulative undergraduate GPA of at least 3.0, and transcripts that show successful completion of:

- 8 semester hours of General Biology
- 8 semester hours of Human Anatomy and Physiology
- 3 credit hours of exercise physiology
- 3 credit hours of general science

Graduate assistantships are available on a competitive basis that cover full tuition costs, in addition to a stipend.

Student Learning Outcomes

1. Demonstrate foundational knowledge of exercise science principles, theories, and research;
2. Critically interpret and critique research in the exercise sciences;
3. Apply ethical standards and principles of practice sanctioned by professional associations in exercise science;
4. Demonstrate advanced ability to apply relevant statistical plans and interpret statistical findings;
5. Conduct publishable, original exercise science research;
6. Communicate research findings following established conventions in the field.

Curriculum

This degree requires:

- A minimum of 81 graduate credit hours (including dissertation credits and Phase I research credits).
- Various doctoral milestones, such as a 45 hour review, successful completion of a qualifying exam at the end of coursework (excluding the 12 dissertation credits); research apprenticeship project; developing and defending a dissertation proposal; and a completed dissertation and a successful oral defense.

EXE PHD Phase I Overview

Phase I - 36 credits minimum including thesis or research project.

Those who enter with a master's degree in exercise science from another institution will have appropriate coursework evaluated for transfer toward phase I requirements. Transfer credit may not exceed 34 credits of graded courses with B or higher grades.

EXE PHD Phase I Courses

Required Phase I Courses (12 Credits)

Code	Title	Credits
EXE 606	Current Literature in Exercise and Sport Science	1-3
EXE 686	Systemic Physiology and Exercise	3
EXE 693	Research Methods in Exercise and Sport Science	3
EDU 647	Introduction to Quantitative Research	3

EXE PHD Phase I Non-Course

Six EXE elective courses (18 credits minimum), including two at the 700 level, and Departmental Selected Topics courses offered under an open number (500 or 700) may be included. These selected topics courses are introduced to reflect faculty research expertise or new faculty joining the department.

Phase I Research Project (6 credits) The project is designed and completed in consultation with a faculty mentor, and could include a laboratory based project and/or secondary data analysis leading to a publishable paper. Projects are formally presented to students and faculty. Students instead may select the thesis option in consultation with a faculty advisor, producing and defending a thesis according to the Graduate School procedures.

EXE PHD Phase II Overview

Phase II - 45 credits minimum, including dissertation.

EXE PHD Phase II Required Courses

Research design, methods, and statistics (15 credits)

Code	Title	Credits
PSY 655	Experimental Design and Statistical Methods I	3
EDU 791	Advanced Seminar in Quantitative Research Methods I	3
PSY 756	Experimental Design and Statistical Methods II	3
Two additional advanced research methods courses at the 600-800 level in consultation with the students' doctoral advisor.		6

EXE PHD Phase II Additional

Exercise Science and Related Electives (18 credits minimum). These are selected from EXE courses 500 level and above, with at least two at the 700 level or higher. Students may also select from a broader list of university courses relevant to their professional goals. Such areas include advanced technical writing, biochemistry, bioengineering, neuroscience, public health, nutrition, and others.

Dissertation (12 credits) - EXE 999 Dissertation.