

# HEALTH AND EXERCISE SCIENCE (HES)

## Master of Science

### Overview

This program offers specialization in the area of health and exercise science and is designed for those who are interested in careers in research, preventive, and rehabilitative programs, and/or further graduate study.

Candidates for the health and exercise science program are not required to have a specific undergraduate major or minor. However, an undergraduate concentration in the sciences is preferred. Candidates for the program generally pursue research careers in exercise science (e.g. exercise physiology, biomechanics, behavioral medicine, or rehabilitation), and/or careers in clinical exercise physiology, rehabilitation, or health behavior promotion (e.g., cardiac rehabilitation, YMCAs, and corporate fitness programs). The prerequisites for this program include course work in human anatomy, human physiology, physiology of exercise, and biomechanics. These courses should be completed before admission to the program. None of the prerequisites may apply toward the graduate degree.

The Department of Health and Exercise Science supports the Healthy Exercise and Lifestyle Programs (HELPS), a chronic disease prevention and management program for the local community. As part of the coursework in HES 761 and HES 765, graduate students serve an internship in HELPS to gain practical experience as clinical exercise specialists. After serving an internship with HELPS during the first academic year, each student will have the opportunity to be certified as an American College of Sports Medicine (ACSM) Clinical Exercise Physiologist.

The Department of Health and Exercise Science began offering graduate study in 1967. Departmental graduate committee: Katula (chair), Beavers, Berry, Brubaker, Marsh, Messier, Mihalko, Miller, Nixon, Rejeski.

## Programs

### Master of Science

- Health and Exercise Science, MS (<https://bulletin.wfu.edu/graduate/programs/degree-programs/health-exercise-science/health-exercise-science-ms/>)

## Courses

### HES 650. Human Physiology. (3 h)

A lecture course that presents the basic principles and concepts of the function of selected systems of the human body, with emphasis on the muscular, cardiovascular, pulmonary, and nervous systems. Berry, Brubaker.

### HES 651. Nutrition in Health & Disease. (3 h)

A lecture/lab course that presents the principles of proper nutrition including an understanding of the basic foodstuffs and nutrients as well as the influence of genetics, eating behavior, and activity patterns on performance, energy balance, and weight control. Labs focus on intervention in obesity and coronary heart disease through diet analysis, methods of diet prescription, and behavior modification. Miller.

### HES 652. Human Gross Anatomy. (4 h)

A lecture/lab course on the structure and function of the human body. Labs are devoted to the dissection and study of the human musculoskeletal, neuromuscular, and vascular systems. Marsh, Messier.

### HES 653. Physiology of Exercise. (3 h)

Lecture course that presents the concepts and applications of the physiological response of the human body to physical activity. The acute and chronic responses of the muscular and cardiorespiratory systems to exercise are examined. Other topics include exercise and coronary disease, strength and endurance training, somatotype and body composition, gender-related differences, and environmental influences. P-HES 650 or POI. Miller, Nixon.

### HES 660. Epidemiology. (3 h)

Introduction to basic determinants of the incidence of chronic disease in the population, and development of an understanding of individual, community, and environmental approaches to promoting healthful lifestyles in youth, adults, and elderly populations. Issues are analyzed by formal statistical modeling. Nixon.

### HES 670. Biomechanics of Human Movement. (3 h)

Study of the mechanical principles which influence human movement, sport technique, and equipment design. Marsh, Messier.

### HES 675. Advanced Exercise Physiology. (3 h)

Lecture course on the study of physiological and biochemical adaptations of the human body to exercise, with special emphasis on substrate metabolism, ventilation and respiration, oxygen transport, and muscle physiology. Berry.

### HES 682. Independent Study. (1-3 h)

Literature reviews and/or laboratory research performed on an individual basis under the supervision of a faculty member. Staff.

### HES 715. Experimental Design. (3 h)

Study of the various types of research relevant to health and exercise science. While attention is given to topics such as statistical treatment of data, the primary emphasis involves discussion concerning threats to internal and external validity for experimental and quasi-experimental designs. In conjunction with a sound methodological approach, practical experiences are provided in the preparation and presentation of thesis proposals. Rejeski.

### HES 721. Data Analysis and Interpretation. (3 h)

The application of basic statistical techniques in the analysis and interpretation of data in scientific research. Topics include descriptive statistics, simple linear and multiple correlation/regression analysis, t-tests, analysis of variance and covariance, and non-parametric statistics. Berry.

### HES 733. Health Psychology. (3 h)

Seminar on current topics in health psychology with a focus on wellness programs and rehabilitative medicine. Mihalko.

### HES 761. Cardiopulmonary Disease Management. (3 h)

A lecture/lab class that examines the physiological, pathologic, and pharmacologic considerations of managing patients with cardiovascular and pulmonary disease. Special emphasis on learning diagnostic procedures, interventions, and therapies, particularly models for cardiac and pulmonary rehabilitation. Brubaker.

### HES 763. Advanced Biomechanics. (3 h)

An in-depth study of the mechanical principles that influence human movement. Topics include the study of kinetics, kinematics, cinematography, sport shoe design, and skeletal biomechanics. P-Anatomy, kinesiology, physics, or POI. Messier.

**HES 765. Graded Exercise Testing and Exercise Prescription. (3 h)**

The study of the rationale for the use of graded exercise testing in the evaluation of functional work capacity and prescription of exercise. Lectures include the analysis of different modes of evaluation: treadmill, bicycle ergometer, arm ergometer, and field testing, with the application of the results in the evaluation of normal and cardiac patients and prescription of exercise for special populations. Lab experiences include the use of electrocardiographs, ergometers, and metabolic analyzers in the assessment of functional capacity. Brubaker.

**HES 780. Advanced Topics in Exercise and Sport Science. (3 h)**

This course is divided into two or more content areas to allow an in-depth treatment of selected topics that are not a regular part of required coursework. Topics are chosen from the following areas: anatomy, biomechanics, computer analysis, multivariate statistics, and physiology of exercise. Seminar and/or lab approach. Staff.

**HES 782. Independent Study in Health and Exercise Science. (1-3 h)**

Literature and/or laboratory research performed on an individual basis under the supervision of a faculty member. Staff.

**HES 783. Seminar in Health and Exercise Science. (1 h)**

Seminar class designed to bring graduate students and faculty together on a regular basis to discuss research proposals, research design and studies, results of research, and current topics in health and exercise science. Talks by invited or visiting speakers are included as seminar sessions. Graduate students receive reading and work assignments related to the material presented in the seminar. May be repeated for credit. Staff.

**HES 784. Seminar in Health and Exercise Science. (1 h)**

Seminar class designed to bring graduate students and faculty together on a regular basis to discuss research proposals, research design and studies, results of research, and current topics in health and exercise science. Talks by invited or visiting speakers are included as seminar sessions. Graduate students receive reading and work assignments related to the material presented in the seminar. May be repeated for credit. Staff.

**HES 791. Thesis Research I. (1-9 h)**

May be repeated for credit. Satisfactory/Unsatisfactory.

**HES 792. Thesis Research II. (1-9 h)**

May be repeated for credit. Satisfactory/Unsatisfactory.

## Faculty

Program Director Jeffrey A. Katula

Chair Peter H. Brubaker

Research Professor W. Jack Rejeski

Professors Michael J. Berry, Peter H. Brubaker,

Anthony P. Marsh, Stephen P. Messier, Shannon L. Mihalko, Gary D. Miller,

Patricia A. Nixon

Associate Professors Kristen M. Beavers, Jeffrey A. Katula,

Assistant Professor Jason Fanning