

# EXERCISE SCIENCE

Department Website (<http://www.sph.sc.edu/exsc/>)

Shawn M. Arent, Ph.D., *Chair*

The mission of the Department of Exercise Science is to expand and disseminate the body of knowledge concerning the relationship between physical activity and human health. A key objective of the Department of Exercise Science is to expand the body of knowledge in the exercise sciences by conducting and publishing research that contributes to an understanding of the following:

- effects of acute and chronic exercise on human function and health
- physiologic and biochemical mechanisms that underlie responses and adaptations to exercise
- physiologic responses to acute and chronic exercise in special populations including children, females, the elderly, chronic disease patients, and those with neurological and/or orthopedic impairments
- neuromuscular and neurophysiological processes associated with motor skill development
- developmental and aging aspects of motor function
- appropriate methods of designing and delivering physical activity programs for purposes of health enhancement, neuromuscular rehabilitation, and perceptual-motor functioning
- behavioral and psychosocial aspects of physical activity.

The Department of Exercise Science offers the following degrees: Master of Science in Athletic Training, Master of Science in Advanced Athletic Training, Master of Public Health, Master of Science, Doctor of Philosophy, and Doctor of Physical Therapy.

## Program Overviews

### Master's Degrees

#### Master of Science in Athletic Training/Advanced Athletic Training

The UofSC AT Program is housed in the Department of Exercise Science in the Arnold School of Public Health. The UofSC AT Program has maintained its accreditation through the Commission on Accreditation of Athletic Training Education (CAATE) since 1996.

The UofSC AT Program provides students with the theoretical knowledge and understanding of the athletic training profession in the context of the larger health care system as well as its current procedures and techniques in sport injury management. Students gain this knowledge through required coursework and clinical experiences as they prepare to make successful contributions to the athletic training profession. The program combines formal classroom instruction and clinical experiences in a process that culminates in the student graduating with eligibility to sit for the Board of Certification (BOC) examination. Students who graduate from the program and subsequently pass the BOC examination will be qualified to be employed as an athletic trainer in a variety of settings, including NFL, MLB, NBA, professional soccer, Division 1 (FBS) colleges, secondary schools, youth sports, orthopedic clinics, hospitals, wellness centers, industry, NASCAR, Cirque du Soleil, US Military, performing arts, and many other places/settings.

#### Master of Public Health in Physical Activity and Public Health ( MPH-PAPH )

The Master of Public Health in Physical Activity and Public Health is the first academic program in the nation designed to prepare professionals to increase physical activity and improve health in populations. The

MPH-PAPH program provides students with the essential knowledge, skills and experiences to design, implement and evaluate physical activity interventions. With the MPH-PAPH degree, there are many career opportunities in the areas of: health and wellness, active transportation to school, corporate wellness, transportation and community design, parks and recreation, chronic disease prevention, community-based physical activity interventions, policy and environmental change, and preparation for working in local and state health departments.

#### Master of Science (M.S.)

The Master of Science [JO1] (p. ) (MS) degree in Exercise Science provides students with foundational content in exercise physiology, research methods and statistics and offers flexibility to select coursework in specific areas of interest, including: applied physiology, neuro-rehabilitation, and sports performance. With the MS in Exercise Science, there are many career opportunities in the areas of: strength and conditioning, sport science, performance nutrition, clinical exercise physiology, cardiac rehabilitation, physical rehabilitation, corporate fitness, health and wellness, research and preparation for additional graduate training (e.g., PhD, DPT, MD, PA). There are many opportunities to participate in ongoing research through assistantships and independent study courses. Students have the option of completing a thesis (focus on research training) or a project (focus on clinical or applied skills training).

### Doctoral Degrees

#### Doctor of Philosophy (Ph.D.)

The Ph.D. program in exercise science is designed to prepare students for research careers in the exercise sciences; graduates are trained for entry into positions in universities, colleges, research institutes and research-oriented clinical settings. Areas of research emphasis correspond to those of the departmental faculty. The Ph.D. degree requires an approved program of up to 60 hours beyond the baccalaureate degree. Students with a master's or DPT degree admitted to the PhD program in Exercise Science, may complete the PhD program in Exercise Science by completing a minimum of 30 additional credit hours (including 12 credit hours of dissertation preparation). Students completing the PhD must meet minimum core requirements including at least 6 hours in Department of Exercise Science or specific area of emphasis, 6 hours in statistics and research design and 12 hours of dissertation preparation. Programs of study are developed by the student's advisory committee and must conform to requirements described in the Graduate Studies Bulletin. Additional information may be found in the Handbook for Graduate Students in Exercise Science.

#### Doctor of Physical Therapy (D.P.T.)

The Physical Therapy Program at the University of South Carolina offers students a unique opportunity to develop clinical physical therapy skills in an intimate learning environment. The 3 year Clinical Doctoral program starts in August of each year and admits a small class size that allows students an opportunity to get individualized instruction and closely interact with instructors. Students complete a research project focused on clinical practice and learn the value of evidence-based practice. Following completion of the DPT, students are eligible to sit for the national physical therapy licensure exam.

## Program Requirements for Exercise Science Degree Programs

A listing of specific courses needed to meet these requirements is available in the department's Handbook for Graduate Students in Exercise

Science. Areas of research emphasis in all degree programs correspond to those of the departmental faculty.

## Department Admission Requirements

Admission to the MS in AT program must be completed through ATCAS: <http://atcas.liasoncas.org/>

Application forms for admission to the M.S. and Ph.D. graduate programs in Exercise Science may be obtained at <http://gradschool.sc.edu/gap> (<http://gradschool.sc.edu/gap/>).

Applicants to the D.P.T. Program should submit an application through the Physical Therapy Centralized Application Service (<http://www.ptcas.org>).

Applicants to the MPH program should submit an application packet through the School of Public Health Application Service (<http://www.sophas.org>).

Graduate assistantships are not ordinarily available to students enrolled in the Doctor of Physical Therapy program. In some instances students may be offered a graduate assistantship during their final two years of study. All graduate assistantships must be related to the student's research and approved by the program director.

## Master of Public Health (MPH) in Physical Activity and Public Health

Applicants to the MPH-PAPH must meet the general requirements of the University of South Carolina Graduate School. Applicants must also have completed an undergraduate program with appropriate preparation in the field in which graduate work is to be undertaken. A demonstration of a broad educational background reinforced with public health interests and experiences in physical activity must be included.

International applicants to the Master of Public Health in Physical Activity program are required to take the Graduate Record Examination (GRE) in order to meet admission requirements. Applicants whose native language is not English are also required to submit a satisfactory score on the TOEFL or the IELTS Intl. Academic Course Type 2 exam. The minimum acceptable score on the TOEFL is 230 (computer-based) or 570 (paper-based). The minimum acceptable overall band score on the IELTS Intl. Academic Course Type 2 exam is 6.5.

Applicants must include an official transcript from each school or college previously attended (all prior postsecondary school study must be represented). In addition, there must be at least three letters of recommendation and a detailed written statement indicating the applicant's area of interest and career goals, along with a current and complete resume.

Other requirements include:

- graduated with a rank in the upper half of the class (GPA>3.00)
- acceptable GRE score of at least 900, combined verbal and quantitative sections (the 2004-05 incoming class averaged 460 on the verbal section and 562 on the quantitative section)
- an official transcript from each school or college previously attended (all prior postsecondary school study must be represented)
- a minimum of three letters of recommendation
- a detailed written statement describing the area of interest and specific career goals.

## Master of Science (M.S.)

### Admission Requirements

- A four-year baccalaureate degree or its equivalent in exercise science, kinesiology, biology, chemistry, pre-med, nutrition, health sciences, physiology, psychology, public health, physical therapy, medical doctor, from an accredited institution
- Academic prerequisites: Human Anatomy and Physiology
- Grade point average of 3.00/4.00 or higher
- Satisfactory GRE scores
- For international applicants, a satisfactory score on the Test of English as a Foreign Language (TOEFL) - minimum score of 80 internet-based, 230 computer-based, or 570 paper-based or the International English Language Testing System (IELTS) Academic Course Type 2 exam - minimum overall band score of 6.5. This requirement may be waived for applicants that have earned a prior degree from a US institution.

### Application Requirements

- Resume or CV
- Statement of Purpose and Objectives describing your academic and research interests, relevant work experiences, academic/professional goals and objectives
- At least three letters of recommendation from academic and/or professional sources (at least one of these letters must be from an academic source)
- Official transcripts from all schools or colleges previously attended
- Non-US institution transcripts must be verified by World Education Services (WES) or equivalent evaluation service. Please submit a comprehensive course-by-course evaluation (WES ICAP)
- GRE scores
- TOEFL or IELTS scores are required for those whose native language is not English

## Doctor of Philosophy (Ph.D.)

Applicants for the Ph.D. program in exercise science must have an earned baccalaureate degree in exercise science or related discipline from an accredited institution and should participate in a personal interview with the departmental admissions committee. A comprehensive academic profile is used in arriving at admission decisions. The following materials and standards are required:

- Graduate School application with stated desired area of research emphasis with the required, nonrefundable application fee
- Graduate Record Examination scores of 50th percentile or better on all three sections are preferred
- transcripts of all previous college/university work
- letters of recommendation from at least three professors with knowledge of the applicant's academic performance
- a writing sample addressing future professional goals and specific research interests
- current curriculum vitae.

## Doctor of Physical Therapy (D.P.T.)

Applicants for the D.P.T. degree in the Department of Exercise Science must have an earned baccalaureate degree from an accredited institution. Applicants are reviewed for admission by a faculty committee

and are formally approved by the Graduate School. The following materials and standards are required:

- Completed PTCAS Application
- Graduate Record Examination scores of 300 or better required on combined verbal and quantitative sections, and 3.5 on the writing section.
- Two letters of recommendation from individuals familiar with the applicant's academic and/or clinical skills
- Official transcripts from all previous college/university work (upon acceptance to the DPT Program)
- \$80 supplemental application fee paid through the USC Marketplace

The applicant's transcripts, regardless of major, must demonstrate successful completion or enrollment in the following prerequisites:

Course	Title	Credits
General Physics	<sup>1</sup>	8
Statistics		3
Chemistry	<sup>1</sup>	8
Anatomy and Physiology	<sup>1</sup>	8
Biology	<sup>1</sup>	8
<b>Total Credit Hours</b>		<b>35</b>

<sup>1</sup> Courses must include a laboratory.

## Programs

- Advanced Athletic Training, M.S. (<https://academicbulletins.sc.edu/archives/2020-2021/graduate/public-health/exercise-science/advanced-athletic-training-ms/>)
- Athletic Training, M.S. (<https://academicbulletins.sc.edu/archives/2020-2021/graduate/public-health/exercise-science/athletic-training-ms/>)
- Exercise Science, M.S. (<https://academicbulletins.sc.edu/archives/2020-2021/graduate/public-health/exercise-science/exercise-science-ms/>)
- Exercise Science, Ph.D. (<https://academicbulletins.sc.edu/archives/2020-2021/graduate/public-health/exercise-science/exercise-science-phd/>)
- Physical Activity and Public Health, M.P.H. (<https://academicbulletins.sc.edu/archives/2020-2021/graduate/public-health/exercise-science/physical-activity-public-health-mp/>)
- Physical Therapy, D.P.T. (<https://academicbulletins.sc.edu/archives/2020-2021/graduate/public-health/exercise-science/physical-therapy-dpt/>)

## Courses

### ATEP 700 - Introduction to Therapeutic Interventions in Athletic Training (3 Credits)

This course is designed to address the basic knowledge and techniques needed to plan, operate, document, and evaluate therapeutic interventions used in treatment of athletic injuries/illnesses. Includes basic knowledge and techniques of therapeutic interventions; modalities and rehabilitation used by athletic trainers.

### ATEP 701 - Principles of Evidenced-Based Medicine (3 Credits)

Development of essential skills for integrating evidence into healthcare practice. Students will learn how to explore critical questions by accessing, interpreting, evaluating, and integrating relevant research literature in healthcare.

### ATEP 702L - Principles of Athletic Training Lab (1 Credit)

Foundational knowledge and skills for athletic trainers in injury prevention, care and recognition, emergency management and their role as a healthcare provider within the larger context of a changing healthcare system.

### ATEP 711 - Clinical Experiences in Athletic Training I (3 Credits)

A 350-hour clinical education experience to develop clinical skills of the practicing Athletic Training professional in a mentor guided model. Improvement in a selected area of clinical practice, specifically assessment, treatment and rehabilitation of lower/upper extremity injuries will be measured via formative and summative assessment that employs quantitative measures.

### ATEP 712 - Clinical Experiences in Athletic Training II (3 Credits)

A 150-hour clinical education experience to develop the clinical skills of the practicing Athletic Training professional in a mentor guided model. Improvement in a selected area of clinical practice, specifically assessment, treatment and rehabilitation of non-orthopedic conditions will be measured via formative and summative assessment that employs quantitative measures.

**Prerequisites:** ATEP 711.

### ATEP 713 - Clinical Experiences in Athletic Training III (3 Credits)

A 150-hour clinical education experience to develop the clinical skills of practicing Athletic Training professionals in a mentor guided model. Improvement in selected areas of clinical practice, specifically prevention and management of medical emergencies in athletic settings will be measured via formative and summative assessment that employs quantitative measures.

**Prerequisites:** ATEP 712.

### ATEP 714 - Clinical Experiences in Athletic Training IV (3 Credits)

A 350-hour clinical education experience to develop the clinical skills of the practicing Athletic Training professional in a mentor guided model. Improvement in a selected area of clinical practice, specifically behavioral health and wellness of patients will be measured via formative and summative assessment that employs quantitative measures.

**Prerequisites:** ATEP 713.

### ATEP 715 - Clinical Experiences in Athletic Training V (6 Credits)

A 450-hour clinical education immersive experience to develop clinical skills of the practicing Athletic Training professional in a setting preferred by the student. Improvement in a selected area of clinical practice will be measured via formative and summative assessment that employs quantitative measures.

**Prerequisites:** ATEP 714.

### ATEP 730 - Behavioral Health and Wellness (3 Credits)

Integration of physiological, psychological, and social constructs in relationship to physical performance and clinical decision making to enhance patient care. Specific focus will be on understanding individual differences in behavior in the areas of physical fitness, nutrition, and mental health.

**ATEP 732 - Emergency Management Practices in Athletic Training (3 Credits)**

Examination of common injuries and illnesses that can cause medical emergencies in sport and physical activity. The majority of the class will be analyzing research related to these conditions to determine prevention and treatment strategies. Education, gender issues, politics, and media will also be a platform for class discussions.

**ATEP 733 - Evidence Based Practice in Medical Emergencies (3 Credits)**

Examination of common injuries and illnesses that lead to medical emergencies (e.g., sudden death) in sport and physical activity. Critical analysis of research to determine prevention and treatment strategies.

**ATEP 734 - Evidence-Based Approach to Evaluation, Treatment, and Rehabilitation (3 Credits)**

Advanced study of principles of evidence-based medicine and the interpretation of clinical research that assesses evaluation, treatment, and rehabilitation of injuries.

**ATEP 735 - Contemporary Issues in Athletic Training (3 Credits)**

Examination of issues shaping the athletic training profession with an emphasis on practical application and professional development.

**ATEP 736 - Advanced Treatment and Rehabilitation of Athletic Injuries (3 Credits)**

Advanced study of the treatment of athletic injuries focusing on the concepts and principles of a comprehensive rehabilitation program, including therapeutic exercise and therapeutic modalities.

**ATEP 737 - Current Research in Athletic Training Education (3 Credits)**

Examination of current literature in athletic training education as it pertains to the clinical and didactic experiences of athletic training students, clinical instructors, and practicing professionals.

**ATEP 738 - Advanced Athletic Training Practicum I (1-3 Credits)**

Provides advanced practical experience and the integration of evidence-based practice in the sports medicine settings. Course content will focus on graduate research project and topics related to athletic training education.

**ATEP 739 - Advanced Clinical Practicum in Athletic Training II (1-3 Credits)**

Provides advanced practical experience and the integration of evidenced-based practice on the sports medicine settings. Course content will focus on graduate research project and topics related to athletic training administration and management.

**ATEP 740 - Evidence Based Practice in Weight Management Assessment (3 Credits)**

Critical analysis of the current literature on weight control and health, metabolism, energy balance, and roll of diet and exercise in prevention and/or treatment in weight management in the physically active population.

**ATEP 741 - Advanced Clinical Skills in Athletic Training (3 Credits)**

This course is designed to assess the advanced clinical skills of graduate athletic training students in their ability to evaluate, manage and prevent athletic injuries. The content of this course will focus on advanced athletic training clinical skills and evidence-based practice.

**ATEP 748 - Evaluation and Therapeutic Intervention of Lower Extremity Injuries (4 Credits)**

Study of the lower extremities as they relate to the prevention; recognition, evaluation and assessment; immediate care; and treatment, rehabilitation and reconditioning of injuries and illnesses to athletes and others engaged in physical activity.

**ATEP 748L - Evaluation & Therapeutic Intervention of Lower Extremity Injuries Lab (1 Credit)**

Integration of knowledge and skills for orthopedic/physical assessment of common injuries to the lower body.

**Corequisite:** ATEP 748.

**ATEP 749 - Evaluation and Therapeutic Intervention of Head, Neck and Spine Injuries (4 Credits)**

Study of the Head, Neck and Spine as they relate to the prevention; recognition, evaluation and assessment; immediate care; and treatment, rehabilitation and reconditioning of injuries and illnesses to athletes and others engaged in physical activity.

**ATEP 749L - Evaluation & Therapeutic Intervention of Head, Neck, & Spine Injuries Lab (1 Credit)**

Integration of knowledge and skills for orthopedic/physical assessment of common injuries to the head, neck and spine.

**Corequisite:** ATEP 749.

**ATEP 750 - Evaluation and Therapeutic Intervention of Upper Extremity Injuries (4 Credits)**

Study of the upper extremities as they relate to the prevention; recognition, evaluation and assessment; immediate care; and treatment, rehabilitation and reconditioning of injuries and illnesses to athletes and others engaged in physical activity.

**ATEP 750L - Evaluation & Therapeutic Intervention of Upper Extremity Injuries Lab (1 Credit)**

Integration of knowledge and skills for orthopedic/physical assessment of common injuries to the upper body.

**Corequisite:** ATEP 750.

**ATEP 770 - Research Methods & Prospectus Writing in Athletic Training (3 Credits)**

The study of applicable methods and tools of research in athletic training. Introduction of methods of research in athletic training, encompassing aspects of study planning, research design, participant sampling, measurement, data analysis, ethics, and reporting in sports medicine.

**ATEP 796 - Athletic Training Administration (3 Credits)**

Examination of fundamental principles of administration and assessment of the delivery of athletic training services in the context of the larger health care system. Specific focus business management principles associated with athletic training clinical practice and as well as leadership and professional development to achieve the best patient outcomes.

**ATEP 797 - Clinical Pathology and Pharmacology in Athletic Training (2 Credits)**

Examination of injury, illness and/or disease of various body systems; specific understanding of medical diagnostics, interventions (including pharmacology) and participation considerations for the athletic population are addressed.

**ATEP 797L - Clinical Pathology & Pharmacology in Athletic Training Lab (1 Credit)**

Integration of knowledge and skills for athletic trainers in the physical assessment of common injury, illness and/or disease of various body systems.

**Corequisite:** ATEP 797.

**ATEP 798 - Project in Athletic Education (3 Credits)**

Independently executed project designed to expand the student's knowledge of athletic training.

**ATEP 799 - Thesis Preparation (1-9 Credits)**

**EXSC 507 - Exercise, Sport, and Nutrition (3 Credits)**

The relationship between exercise, sport performance, and nutrient metabolism.

**Prerequisites:** EXSC 223, EXSC 224, EXSC 330, EXSC 330L.

**EXSC 531 - Clinical Exercise Physiology (3 Credits)**

Scientific bases of clinical exercise programming. The fitness instructor's role in encouraging changes in exercise behavior.

**Prerequisites:** EXSC 223, EXSC 224, EXSC 330, EXSC 330L.

**Corequisite:** EXSC 531L.

**EXSC 531L - Clinical Exercise Physiology Lab (0 Credits)**

**Prerequisite:** EXSC 223, EXSC 224, EXSC 330, EXSC 330L.

**EXSC 541 - Physiological Basis for Strength and Conditioning (3 Credits)**

Investigation on the physiological basis for strength and conditioning. Principles of strength and conditioning through lecture based learning, demonstrations, and through laboratory activities.

**Prerequisites:** C or better in EXSC 330.

**EXSC 555 - Current Topics in Exercise Science (1-3 Credits)**

Content varies by title. Course may be repeated for a total of 6 credit hours.

**EXSC 562 - Impairments of the Human Motor System (3 Credits)**

Role of motor development in the growth and development of individuals exhibiting impaired motor control.

**Prerequisites:** biology, anatomy, physiology, or the equivalent.

**EXSC 563 - Physical Activity and the Physical Dimensions of Aging (3 Credits)**

The effects of age and physical activity on physical and motor functions of elderly individuals.

**Prerequisites:** EXSC 223, EXSC 224, EXSC 351, EXSC 330, EXSC 330L.

**EXSC 585 - Women's Health and Physical Activity (3 Credits)**

Sex differences in diseases, physiological function of sex hormones, hormonal changes in a woman's life, specific women's health issues, and role of physical activity and exercise in prevention and treatment of conditions and diseases specific to women or related to sex hormones. Restricted to 30 students, Special Permission by Instructor.

**EXSC 608 - Apps, Wearables and Technology for Lifestyle Behavior Change and Weight Loss (3 Credits)**

The course will increase students' understanding of the theoretical foundations, scientific evidence and practical application of technology-assisted lifestyle interventions, with an emphasis on behavioral weight control for adults.

**Prerequisites:** C or better in EXSC 410.

**EXSC 620 - Nutrition and Immunology (3 Credits)**

Examination of the interrelationships that link human nutrition to the immune system in health and disease. Topics will include basic immunology, overview of nutritional sources, deficiencies and excesses, and the impact on public health issues such as exercise, disease and aging.

**Prerequisites:** EXSC 330.

**EXSC 626 - Cardiorespiratory Exercise Physiology (3 Credits)**

Examination of the anatomy and function of the cardiovascular and respiratory systems of the exercising human organism, including acute adjustments and chronic adaptations to the systems.

**Prerequisites:** EXSC 330.

**EXSC 666 - Cardiorespiratory Exercise Physiology (3 Credits)**

Examination of the anatomy and function of the cardiovascular and respiratory systems of the exercising human organism, including acute adjustments and chronic adaptations to the systems.

**Prerequisites:** EXSC 330.

**EXSC 669 - Skeletal Muscle Physiology: Form and Function (3 Credits)**

Skeletal muscle physiology and exercise through select laboratory experiences and discussion of related research literature.

**Prerequisites:** C or better in both EXSC 330 and EXSC 330L.

**EXSC 695 - Writing and Presenting in Research (3 Credits)**

The research process in Exercise Science through participation, presentation, and discussion of current research.

**Prerequisites:** EXSC 224.

**EXSC 700 - Physical Activity and Health: Epidemiology, Research and Practice (3 Credits)**

An introduction to exercise science with emphasis on the relationships between exercise and health for promotion of physical activity in clinical and public health settings.

**EXSC 706 - Assessment of Motor Behavior (3 Credits)**

Assessment of infant, child, adolescent, and adult motor behavior.

**EXSC 710 - Behavioral Aspects of Physical Activity (3 Credits)**

Psychosocial and behavioral factors in physical activity. Topics include mental health effects of exercise, behavior change theories applied to mental health effects of exercise, behavior change theories applied to physical activity, and physical activity determinants and interventions.

**Cross-listed course:** HPEB 713

**EXSC 723 - Genetics in Health Sciences (3 Credits)**

The part lecture and part discussion course will explore genetic research in the health sciences, with emphasis on human genetic association studies, clinical utility for personalized medicine, direct-to-consumer genetic testing, and ethical issues. Students will receive hands-on experience searching, interpreting, and summarizing genetic studies on a topic of their choice.

**EXSC 727 - Controlled Trials in Exercise Science (3 Credits)**

This course covers planning, organizing and implementing randomized controlled trials of physical activity or exercise interventions. It is primarily aimed to meet the needs of graduate students in exercise science and others in related fields.

**EXSC 731 - Mechanisms of Motor Skill Performance (3 Credits)**

A study of theories and mechanisms involved in human movement. Focus is on analysis of principles and systems of gross motor control and learning.

**EXSC 732 - Measurement of Body Composition and Associated Health Behaviors (3 Credits)**

Overview of measurement theory and measures to assess body composition and associated health behaviors (i.e., physical activity, sedentary behavior, sleep, diet).

**Prerequisites:** BIOS 700, BIOS 701, or PUBH 725; for MPH-PAPH students, EXSC 700.

**EXSC 742 - Clinical Exercise Testing (1 Credit)**

Study of the procedures involved in screening and testing persons with varying levels of functional work capacity.

**EXSC 743 - Laboratory Measurements for Exercise Testing (1 Credit)**

Biological and physiological assessment of exercise responses and adaptation.

**Prerequisites:** EXSC 742.

**EXSC 744 - Administration of Exercise Programs (1 Credit)**

Study of the procedures necessary for proper administration of exercise testing, fitness, and rehabilitation programs.

**Prerequisites:** EXSC 531.

**EXSC 754 - Community-Based Physical Activity Interventions (3 Credits)**

Role of the physical activity specialist within the community health department. Development, initiation, and evaluation of campaigns, resources, community capacity building, and coalitions to promote physical activity.

**Prerequisites:** EXSC 700 or HPEB 700.

**EXSC 755 - Special Topics in Exercise Science (3 Credits)**

A study of selected issues in exercise science. Content varies by title.

**EXSC 771 - Data Acquisition in Exercise Science (3 Credits)**

Fundamental concepts of computerized data acquisition in the exercise science laboratory.

**EXSC 775 - Neural Basis of Skilled Motor Behavior (3 Credits)**

Current and historical perspectives on the neural basis of skilled motor behavior.

**Prerequisites:** EXSC 731.

**EXSC 777 - Endocrinology of Exercise and Health (3 Credits)**

The course examines the endocrine system, its interaction with the nervous system, and how they affect human biology before, during, and after exercise. Special attention will be paid to this system's influence on the relationship between physical activity and health.

**Prerequisites:** At least one undergraduate or graduate course in statistics and molecular or cellular biology.

**EXSC 778 - Exercise and Childhood Obesity (3 Credits)**

Causes and treatment of childhood obesity with special reference to the role of exercise in prevention and early intervention.

**EXSC 779 - Exercise Physiology of Children and Youth (3 Credits)**

Principles of exercise physiology applied specifically to children and youth. Particular emphasis on physiological foundations of physical fitness and methods for teaching physical fitness concepts.

**EXSC 780 - Physiology of Exercise (3 Credits)**

Physiological responses to exercise: skeletal muscle structure and function, cardiorespiratory function, physiological determinants of exercise performance, and training adaptations. Didactic and laboratory included.

**EXSC 781 - Physiology, Exercise, and Disease (3 Credits)**

The input and response to exercise in diseased populations. Diseases to be examined include cardiovascular disease, age-related diseases, pulmonary, renal, and other conditions.

**Prerequisites:** EXSC 780.

**EXSC 782 - Mechanical Analysis of Motor Skills (4 Credits)**

Biomechanical principles underlying motor control and selected techniques used to quantify human movement.

**EXSC 783 - Research Seminar in Exercise Physiology (1-3 Credits)**

Presentation and discussion of current research topics in exercise physiology.

**EXSC 784 - Cardiovascular/Pulmonary Testing and Programming (3 Credits)**

Techniques used in exercise testing (including principles of electrocardiology) and in design and delivery of exercise programs for enhancing the health of normal and cardiopulmonary-diseased populations.

**Prerequisites:** EXSC 781.

**EXSC 785 - Advanced Exercise Physiology Laboratory (3 Credits)**

Laboratory procedures for measurement of physiological, biochemical, and molecular responses to exercise.

**Prerequisites:** EXSC 780.

**EXSC 786 - Experimental Design for Translational Laboratory Science (3 Credits)**

This course establishes the framework for experimental projects in molecular biology and physiology that impact human health: how to set up a molecular system, design experiments within that system, determine and use the correct set of controls, and ultimately how to interpret molecular data in light of human/public health.

**Prerequisites:** At least one undergraduate or graduate course in statistics and molecular or cellular biology.

**EXSC 787 - Research Methods and Design for Exercise Science (3 Credits)**

The major goal of this course is to provide an in-depth examination of: research concepts, terminology, experimental, non-experimental, and epidemiological designs, internal and external validity, methods for establishing causality investigating associations, and application of designs to test hypotheses in research of exercise science-related outcomes.

**EXSC 790 - Independent Study (1-3 Credits)**

Topics to be assigned and approved by advisor, graduate director, and department head.

**EXSC 795 - Internship in Exercise Science (3 Credits)**

Clinical practice in an applied area of exercise science. Requirements include at least 20 hours fieldwork per week with intensive supervision.

**EXSC 796 - MPH Capstone Course (2 Credits)**

This course is designed to provide students with a culminating seminar focused on the synthesis of foundational and MPH-PAPH competencies in preparing a high quality grant proposal to address a public health problem.

**Prerequisites:** PUBH 725, PUBH 726, PUBH 730, PUBH 735, B or better in EXSC 700, EXSC 710, EXSC 780.

**EXSC 797 - Public Health Practice (1-5 Credits)**

The focus of this course is the performance of a limited work or service project in an approved public need setting and the demonstration of at least 5 competencies related to previously identified aspects of the student's chosen role.

**Prerequisites:** PUBH 725, PUBH 726, PUBH 730, PUBH 735, B or better in EXSC 700, EXSC 710, EXSC 780.

**EXSC 798 - Project in Exercise Science (3 Credits)**

Independently executed project designed to expand the student's knowledge of exercise science.

**EXSC 799 - Thesis Preparation (1-9 Credits)**

**EXSC 801 - Ethical Conduct in Public Health Research (1 Credit)**

The course will provide an overview of ethical issues scientists encounter conducting and disseminating public health research. Topics include the history of ethics in public health, working with human participants, conflicts of interests, spin, and creating safe and healthy workplaces.

**EXSC 802 - Predoctoral Fellowship Writing Course with Special Emphasis on NIH F31 (1 Credit)**

The course is designed to enable predoctoral students to gain grant writing experience, develop into productive, independent research scientists, and to obtain mentored research training while conducting dissertation research.

**EXSC 808 - Neuro Repair - Rehabilitation (3 Credits)**

Examination of neural repair and rehabilitation from a clinical perspective.

**EXSC 831 - Mechanisms of Motor Skill Performance II (3 Credits)**

Advanced study of the theories and mechanisms of human movement and motor performance. Focus is on analysis of principles and systems regulating gross motor control and learning.

**EXSC 832 - Research Practicum in Motor Learning/Motor Performance (3 Credits)**

Scientific investigation of specific research problems in motor learning/motor performance.

**EXSC 862 - Analysis of Motor Impairments (3 Credits)**

The study of neuromuscular bases of movement and associated impairments of motor function. Current assessment and programming techniques designed to assist in remediating motor impairment will be emphasized.

**EXSC 863 - Physical Activity and the Aging Process (3 Credits)**

The study of the aging process and its effects upon the physical activity patterns of the adult. Emphasis is on the mechanisms of aging as they directly influence movement.

**EXSC 871 - Data Acquisition in Exercise Science II (3 Credits)**

Advanced techniques of interfacing data acquisition equipment to the laboratory computer.

**EXSC 880 - Myology and Exercise (3 Credits)**

Study of muscle contraction mechanics, energetics, and metabolism and the relationship of these processes to physical training, athletics, and rehabilitation.

**EXSC 881 - Advanced Cardiorespiratory Exercise Physiology (3 Credits)**

Study of mechanisms for cardiovascular and respiratory responses to acute exercise and adaptations to these systems with chronic physical activity.

**EXSC 882 - Physical Activity and Health: Epidemiology and Research Methods (3 Credits)**

An examination of physical activity/exercise habit patterns as they relate to health status. Emphasis on the chronic effects of exercise.

**EXSC 883 - Chronic Disease Rehabilitation Through Exercise (3 Credits)**

The study of the treatment of chronic diseases with special reference to exercise as a mode of therapy.

**Prerequisites:** EXSC 531 and EXSC 780 or the equivalent.

**EXSC 899 - Dissertation Preparation (1-12 Credits)****PHYT 701 - Human Musculoskeletal and Gross Anatomy (5 Credits)**

Intensive study and analysis of the morphologic, functional and imaging anatomy of the human body. Emphasis on the relationship of form and function as a basis for understanding of human movement.

**PHYT 702 - Musculoskeletal and Gross Anatomy Dissection (3 Credits)**

In depth, hands on study and analysis of the major gross anatomical structures, their relationships to each other and the clinical importance through cadaveric dissection.

**PHYT 720 - Fundamentals of Physical Therapy (4 Credits)**

An overview of the profession and basic skills needed by the physical therapist related to patient evaluation and management.

**PHYT 721 - Health Promotion & Wellness in Physical Therapy (2 Credits)**

Presents the role of the physical therapist in health promotion and wellness for patients/clients and the community.

**PHYT 731 - Mechanisms of Motor Skill Performance (3 Credits)**

A study of theories and mechanisms involved in human movement. Focus is on analysis of principles and systems of gross motor control and learning.

**PHYT 740 - Professional Issues in Physical Therapy (2 Credits)**

PHYT 740 is designed to allow you to enhance patient interaction through the development of professional communication skills, to explore professional ethics and the APTA Core Values, and to foster a professional identity.

**PHYT 741 - Clinical Documentation in Physical Therapy (1 Credit)**

Enhance patient interaction through the development of professional communication skills, to develop appropriate documentation skills, and to foster a professional identity.

**PHYT 750 - Orthopedic Physical Therapy I (4 Credits)**

Principles of physical therapy evaluation and treatment of people with orthopedic disorders involving the cervical spine and/or upper extremity.

**PHYT 751 - Orthopedic Physical Therapy II (3 Credits)**

Principles of physical therapy evaluation and treatment of people with orthopedic disorders involving the lumbar spine and/or lower extremity.

**PHYT 752 - Orthopedic Integration in Physical Therapy (4 Credits)**

An advanced course to enhance physical therapy students' knowledge of orthopedic examination tests and manual therapy interventions. Emphasis will be placed on diagnostic accuracy of special tests (sensitivity, specificity, likelihood ratios, reliability and validity), interpretation of the results, proper execution, and integration of manual techniques into clinical practice.

**PHYT 753 - Research Proposal Development (1 Credit)**

Fundamentals of developing a research proposal.

**PHYT 754 - Manual Therapy I (3 Credits)**

Joint and soft tissue mobilization and manipulation techniques.

**PHYT 755 - Manual Therapy II (3 Credits)**

Techniques will include spinal mobilization, mobilization with movement, manipulation, muscle energy, taping, soft tissue mobilization and integration of techniques into clinical practice.

**PHYT 756 - Integumentary Physical Therapy (2 Credits)**

Physical therapy management of patients with integumentary disorders.

**PHYT 757 - Pharmacology for the Physical Therapist (2 Credits)**

Management of the physical therapy patient on selected medications.

**PHYT 758 - Patient Education in Physical Therapy (1 Credit)**

Role of the physical therapist in professional and patient education.

**PHYT 759 - Therapeutic Exercise (2 Credits)**

Therapeutic exercise for the orthopedic patient: selection of techniques, rate of progression and modification.

**PHYT 760 - Orthotics and Prosthetics (2 Credits)**

Management of patients with amputations, prosthetics, and orthotics.

**PHYT 761 - Pain Mechanisms and Treatment (2 Credits)**

This course will address the theoretical models for understanding the basis for pain. Pain assessment and physical therapy pain management will be addressed. Emphasis will be placed on the development of clinical decision-making and problem solving.

**PHYT 763 - Biophysical Agents in Physical Therapy (1 Credit)**

This course studies theoretical and practical applications for safe, effective use of biophysical agents commonly used in physical therapy settings using evidence based practice.

**PHYT 764 - Cultural Competence in Health Care (3 Credits)**

Cultural competencies necessary for the delivery of health care to patients of diverse ethno-cultural heritages.

**PHYT 765 - Geriatric Physical Therapy (2 Credits)**

Fundamental principles for assessment, treatment and overall foundations of geriatric physical therapy based upon the best available evidence.

**PHYT 766 - Essentials of Cardiopulmonary Physical Therapy (3 Credits)**

Physical therapy management of patients/clients with acute and chronic cardiac and/or pulmonary dysfunction.

**PHYT 770 - Acute Care Physical Therapy (3 Credits)**

Cognitive and motor skills required in the management of the acute care physical therapy patient.

**PHYT 777 - Special Topics in Physical Therapy (1-3 Credits)**

A study of selected issues in the field of physical therapy. Course content varies by title. May be repeated for credit as topics vary for a maximum of 6 credit hours total.

**PHYT 782 - Functional Anatomy (4 Credits)**

Biomechanical principles underlying motor control and selected techniques used to quantify human movement.

**PHYT 785 - Seminar in Physical Therapy (1 Credit)**

Critical review of professional literature pertaining to clinical practice in physical therapy. Repeatable for credit.

**PHYT 786 - Research Seminar in Physical Therapy (1 Credit)**

Presentation and discussion of current research topics in physical therapy.

**PHYT 787 - Seminar and Research in Physical Therapy (1 Credit)**

Presentation of physical therapy research, article reviews, and clinical in-services. This course deals with the scientific research process with direct application to the discipline of Physical Therapy.

**PHYT 788 - Evidence-Based Practice in Physical Therapy (2 Credits)**

Research design and analysis techniques necessary for applying evidence-based practice to the clinical physical therapy setting.

**PHYT 790 - Independent Study (1-3 Credits)**

Topics to be approved by advisor and graduate director. Pass/fail grading.

**PHYT 806 - Differential Diagnosis and Clinical Reasoning for Physical Therapists (2 Credits)**

Students will gain knowledge and expertise to competently screen for systemic diseases, interpret clinical findings and differentially diagnose movement related impairments from medical conditions that can mimic symptoms of neuromusculoskeletal problems. Emphasis will be placed on Skills necessary to identify patient/client problems that require referral to another health professional.

**PHYT 807 - Neuroplasticity and Genetics in Physical Therapy (1 Credit)**

A study of neuroplasticity and genetics in relation to motor rehabilitation. Focus is on the analysis and application of key constructs in the design and implementation of rehabilitation interventions in individuals with neurologic diagnoses.

**PHYT 808 - Neuro Repair - Rehabilitation (3 Credits)**

Examination of neural repair and rehabilitation from a clinical perspective.

**PHYT 809 - Neuromuscular Assessment and Treatment I (3 Credits)**

Neurological conditions and interventions commonly used in physical therapy practice.

**PHYT 810 - Neuromuscular Assessment and Treatment II (4 Credits)**

Neurological conditions and interventions commonly used in physical therapy practice.

**PHYT 811 - Pediatric Physical Therapy (3 Credits)**

Assessment and evaluation of selected pediatric conditions.

**PHYT 815 - Management of Physical Therapy Practice (2 Credits)**

Theory and application of management supervision and leadership skills necessary for the practice of physical therapy.

**PHYT 850 - Clinical Experience in Physical Therapy I (6 Credits)**

A 320 hour clinical education experience to develop physical therapy management skills of orthopedic patients.

**PHYT 851 - Clinical Experience in Physical Therapy II (4 Credits)**

Supervised clinical experience in a physical therapy setting.

**PHYT 852 - Clinical Experience in Physical Therapy III (6 Credits)**

Supervised clinical experience in a physical therapy setting.

**PHYT 853 - Clinical Experience in Physical Therapy IV (6 Credits)**

Supervised clinical experience in a physical therapy setting.

**PHYT 860 - Clinical Experience in Physical Therapy IVa (1 Credit)**

An 80 hour clinical education experience to demonstrate professional behaviors while safely managing a partial caseload.

**PHYT 861 - Clinical Experience in Physical Therapy IVb (5 Credits)**

A 400 hour clinical education experience to develop physical therapy management skills in a setting preferred by the student.

**Prerequisites:** PHYT 860.

**PHYT 888 - Research Project in Physical Therapy (1-6 Credits)**

Clinically based research project in physical therapy.

**PHYT 899 - Dissertation Preparation (1-12 Credits)**

CL: 2020.