EXERCISE SCIENCE (EXSC)

EXSC 301. INTRODUCTION TO EXERCISE SCIENCE. 1 Credit.
Pre-requisites: sophomore standing and declared as an Exercise Science major.
Covers the basic skills necessary for success in the Exercise Science Program and prepares students for a career or graduate school. Students are exposed to professionals from multiple career fields related to Exercise Science. Presentations include the development of a resume and cover letter, how to use the library effectively, and various professional development tools. The goal of this course is to help gain a clear understanding of career aspirations.

EXSC 355. CARE AND PREVENTION OF INJURIES. 3 Credits.
Pre-requisites: sophomore standing.
Explores the development, progression, and treatment of musculoskeletal injuries. There is an examination of injury incidence and risk factors for common musculoskeletal injuries affecting the upper and lower body. Additional topics include the inflammatory response to injury, the healing process of musculoskeletal tissues, the structural properties of biological tissues, mechanisms of pain perception, and strategies for injury prevention and treatment.

EXSC 380. NUTRITION IN SPORT AND EXERCISE. 3 Credits.
Pre-requisites: PHED 372 or FNDT 356, or permission of the instructor.
Explores the scientific basis for sports nutrition to optimize health and performance in all levels of athletes. Topics include dietary requirements for specific athletes, sports, and activities. Other topics may include weight control, dietary ergogenic aids, nutritional supplements, periodization of nutrition, and diet modifications for all levels of athletes.

EXSC 388. EXERCISE SCIENCE PRACTICUM. 1-8 Credits.
Pre-requisites: EXSC 301, permission of the instructor.
This experiential learning course is designed to assist exercise science pre-physical therapy (PT), pre-occupational therapy (OT), and pre-athletic training (AT) students develop an understanding and awareness of the job responsibilities of therapists and trainers and prepare for application to pre-professional graduate programs.

EXSC 390. PRINCIPLES OF PROGRAM DESIGN. 3 Credits.
Pre-requisites: PHED 350 with a grade of ≥C+.
Designed to identify the connection between assessment data, goal setting, and physical development through exercise program design. Students evaluate information from previous courses and apply that information to create interventions that improve health, fitness, and performance.

EXSC 395. INTERNSHIP. 1-8 Credits.
Pre-requisites: permission of the instructor.

EXSC 411. PHYSICAL ACTIVITY, MENTAL HEALTH, AND COGNITION. 3 Credits.
Pre-requisites: sophomore standing.
Examines neurobiological and psychological premises for the mood-enhancing effects of physical activity, the relationship between physical activity and prevalent forms of mental illness, the role of physical activity in cognitive function across the life span, and the relationship between physical activity, sleep, and brain health.

EXSC 420. PRINCIPLES OF PROGRAM DESIGN FOR SPECIAL POPULATIONS. 4 Credits.
Pre-requisites: EXSC 390 and PHED 372, or LMED 201 and EXSC 390, with a grade of ≥C+.
Focuses on the pathophysiology, identifies risk factors as well as signs and symptoms, and examines exercise management principles and, in certain cases, dietary recommendations for prevalent forms of chronic diseases. Assists in preparing students to work safely and effectively with special populations.

EXSC 440. EXERCISE COUNSELING AND BEHAVIOR CHANGE. 3 Credits.
Pre-requisites: EXSC 390.
Explores health behavior change theories related to the adoption of healthy active lifestyles. Communication and motivational techniques to enhance exercise counseling are examined. Further, this course familiarizes students with educational resources that may support healthy lifestyle behaviors in their clients.

EXSC 452. CLINICAL BIOMECHANICS. 3 Credits.
Pre-requisites: PHED 352 with a grade ≥C+.
Examines common applications of biomechanics within the clinical exercise science and healthcare settings. Focuses on expanding knowledge of biomechanical measures and analyses into clinical pathologies which impact human movement. Emphasis is placed on collecting clinically-relevant data, calculating metrics, and understanding measurements derived from movement analysis equipment. This knowledge is applied in the analysis of various movement pathologies and disorders.

EXSC 455. RESEARCH AND ANALYSIS. 3 Credits.
Pre-requisites: CSBS 320 or MATH 380.
Designed to teach the students to critically analyze the literature in the field. In addition, they are exposed to the criteria for good research and to evaluate how well articles in the field follow that criteria.

EXSC 460. PHYSIOLOGY OF EXERCISE. 4 Credits.
Pre-requisites: PHED 349 and PHED 350, with grades of ≥C+, or permission of the instructor.
Examines the response of body systems to acute and chronic exercise, with additional examination of the effects of the environment on exercise performance.

EXSC 481. ELECTROCARDIOLOGY INTERPRET. 3 Credits.
Pre-requisites: BIOL 233 with a grade ≥C and PHED 350 with a grade ≥C+.
Examines the various components of electrocardiography in normal and pathological hearts. A practical component allows students to gain hands-on experience in conducting resting ECGs and ECGs during a physiological stress test.

EXSC 488. PROFESSIONAL INTERNSHIP. 5-15 Credits.
Pre-requisites: EXSC 301 or permission of the instructor.
Designed to assist Exercise Science students prepare for a job in their chosen field. The internship experience is hands-on under the supervision of a professional, monitored by the faculty advisor. Students complete the majority of their course work to prepare for the experience. The requirement is 400 hours and may be divided into three locations. The experience will be documented through record of hours and regular reflections of the experience.

EXSC 490. SENIOR CAPSTONE IN EXERCISE SCIENCE. 3 Credits.
Pre-requisites: EXSC 420, senior standing. Corequisite: EXSC 490L.
Satisfies: a university graduation requirement—senior capstone.
Covers aging and physical activity. As an officially designated service-learning course, students complete a service-learning project that integrates and applies knowledge gained throughout the exercise science program and requires independent and critical thinking, as well as professional conduct, collaboration, and communication with peers, older adults, and community partners. Companion course to EXSC 490L.

EXSC 490L. SENIOR CAPSTONE IN EXERCISE SCIENCE LAB. 1 Credit.
Pre-requisites: EXSC 420, senior standing. Corequisite: EXSC 490.
Companion lab to EXSC 490.

EXSC 495. INTERNSHIP. 1-15 Credits.
Pre-requisites: permission of the instructor, department chair and college dean.

EXSC 496. EXPERIMENTAL. 1-15 Credits.

EXSC 499. DIR STUDY. 1-15 Credits.

EXSC 500. RESEARCH WRITING IN EXERCISE SCIENCE. 2 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Focuses on developing graduate-level scientific writing skills necessary for success in graduate-level Exercise Science courses and professional careers. Emphasis is placed on mastering APA formatting and writing effectively for diverse scientific and clinical audiences. Focus is placed on developing and enhancing skills in analyzing and synthesizing literature and communicating complex ideas in a clear and precise manner.

EXSC 501. RESEARCH METHODS IN EXERCISE SCIENCE. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Examines types of research designs and the associated components and structure. The focus is placed on considering different research designs across varied settings, implementing these designs with data collection procedures, and how studies are designed and reviewed for ethical implementation. Application of course information is primarily demonstrated by developing, writing, and presenting original research project proposals based on current, peer-reviewed literature.

EXSC 502. STATISTICS IN EXERCISE SCIENCE. 3 Credits.
Pre-requisites: EXSC 501.
Develops an understanding of statistical methodology as it relates to the field of exercise science. Focus is placed on the ability to summarize, analyze, and interpret data using descriptive and inferential statistics in a computer program.

EXSC 510. CARDIOVASCULAR PHYSIOLOGY. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Examines cardiovascular structure and function, contraction dynamics, hemodynamics, responses to exercise, and effects of detraining and aging.

EXSC 520. SKELETAL MUSCLE PHYSIOLOGY. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Examines skeletal muscle anatomy, physiology of muscle action, responses to exercise, and effects of detraining and aging.

EXSC 530. PHYSICAL ACTIVITY OF HEALTH & DISEASE. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Examines in-depth topics relating to the role of physical activity on health and well-being. Focus is placed on how physical activity impacts overall health and various clinical conditions such as cardiovascular, pulmonary, metabolic, orthopedic, musculoskeletal, and immunological diseases. Special consideration is placed on understanding the mechanistic pathways for physical activity to benefit the prevention and treatment of disease.

EXSC 540. LAB TECHNIQUES IN EXERCISE SCIENCE. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Develops skills with exercise science lab equipment, measurement procedures, and data processing techniques, for equipment commonly used in exercise physiology and biomechanical research. An emphasis is placed on the fundamental concepts in exercise physiology and biomechanics through hands-on experience with standard testing equipment.

EXSC 550. ADVANCED BIOMECHANICS. 3 Credits.
Notes: a foundational understanding of exercise science (kinesiology), anatomy, and physics is assumed, along with proficiency in basic algebra and trigonometry for interpreting and solving problems using words, graphs, equations, and formulas.
Pre-requisites: accepted into the MS in Exercise Science program.
Explores advanced biomechanics, focusing on the analysis of internal and external forces acting on the human body and their effects on movement. Emphasis is placed on developing practical skills to analyze movement both qualitatively and quantitatively, with applications relevant to professional practice. Learning is supported by current evidence-based practices and peer-reviewed literature to solve real-world movement situations.

EXSC 555. CARE AND PREVENTION OF INJURIES. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Explores the development, progression, and treatment of musculoskeletal injuries. There is an examination of injury incidence and risk factors for common musculoskeletal injuries affecting the upper and lower body. Additional topics include the inflammatory response to injury, the healing process of musculoskeletal tissues, the structural properties of biological tissues, mechanisms of pain perception, and strategies for injury prevention and treatment.

EXSC 560. ADVANCED PRINCIPLES OF STRENGTH & CONDITIONING. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
Examines in-depth topics that address the principles of designing training programs of varying durations aimed at improving health and fitness in active and athletic populations. Emphasis is placed on creating and administering evidence-based periodized training programs and ensuring safe and productive techniques of fundamental exercises.

EXSC 570. NEUROMECHANICS AND MOTOR CONTROL. 3 Credits.
Pre-requisites: accepted into the MS in Exercise Science Program.
Provides an integrated understanding of neuromechanics and motor control, focusing on the interaction between the nervous and musculoskeletal systems in human movement. Emphasis is placed on the theoretical principles of motor control and behavior, and neuromechanical mechanisms underlying movement patterns. A critical analysis of peer-reviewed literature will explore changes in motor control across the lifespan and adaptations resulting from aging, disease, or injury.

EXSC 580. NUTRITION IN SPORT AND EXERCISE. 3 Credits.
Pre-requisites: PHED 372, FNDT 356, or permission of the instructor.
This course explores the scientific basis for sports nutrition to optimize health and performance in all levels of athletes. Topics include, but are not limited to, dietary requirements for specific athletes, sports, and activities. Other topics may include weight control, dietary ergogenic aids, nutritional supplements, periodization of nutrition, and diet modifications for all levels of athletes.

EXSC 600. THESIS. 1-9 Credits.
Pre-requisites: instructor permission required.
The purpose of the thesis is to provide the opportunity to conceptualize, design, conduct, and disseminate an original research study related to exercise science.

EXSC 605. EXPERIENTIAL LEARNING PORTFOLIO. 1-6 Credits.
Pre-requisites: accepted into the MS in Exercise Science program.
The purpose of the experiential learning portfolio is to provide students with a guided, practical experience at a qualified program site. Students prepare a portfolio of the experiences and achievements related to pre-approved learning objectives. A formal presentation of the portfolio and experience is provided in an open meeting format.

EXSC 695. INTERNSHIP. 1-15 Credits.
Pre-requisites: instructor permission required.
The purpose of the internship is to provide the opportunity to gain professional experience in the exercise science fields under the guidance of a professional currently employed in the field.

EXSC 696. COLLEGE TEACHING INTERNSHIP. 1-15 Credits.
Pre-requisites: instructor permission required.
The purpose of the college teaching internship is to provide the opportunity to gain teaching experience in the exercise sciences. Students gain experience in and understanding of course planning, arranging instructional aids, class instruction, preparation of assessments, and/or grading of assessments.