

# EXERCISE SCIENCE (EXSC)

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## **EXSC 131 Fitness Concepts (3 credits)**

Restriction(s): Students with a major in Exercise Science or a minor in Sports Coaching or Sports Nutrition only. Students will acquire competencies in the basic concepts of fitness including principles of training for warm-ups and cool downs, health-related vs. skill-related fitness, fitness testing, progressive overload and movement and posture analysis.

## **EXSC 150 Principles and Practices of Risk Management for Exercise Science (3 credits)**

Restriction(s): Exercise Science majors and Sports Coaching minors only. Students will engage in active learning of best practices for health and fitness facility management, including topics such as risk management practices for hiring employees, emergency preparedness and management, and basic injury care and treatment. Students who successfully demonstrate competence on the learning outcomes will be eligible for Basic Life Support Provider or CPR for the Professional Rescuer and Automated External Defibrillation Certifications.

## **EXSC 151 Yoga, Relaxation and Stress Reduction (1 credit)**

Restriction(s): Exercise Science majors only. Provides for the development of basic skills in the performance and teaching of hatha yoga and basic neuromuscular relaxation. Each student will be able to plan and implement stress reduction programs for individuals in a one-to-one counseling situation and teach sessions in a classroom format.

## **EXSC 233 Leadership in Aerobic Exercise (3 credits)**

Prerequisite(s): PEMJ 131. Restriction(s): Exercise Science major or Sports Nutrition minor only. Students will acquire skills in performing, demonstrating, and teaching aerobic activities.

## **EXSC 234 Leadership in Anaerobic Exercise (3 credits)**

Prerequisite(s): EXSC 131 or PEMJ 131. Restriction(s): Exercise Science major and Sports Nutrition minor only. Students will acquire skills in performing, demonstrating, and teaching strength training and anaerobic conditioning.

## **EXSC 255 Research Methods and Data Interpretation (3 credits)**

Prerequisite(s): STAT 109. Restriction(s): Exercise Science majors only. This course will provide students with the knowledge and basic skills related to finding and evaluating research literature, the scientific method, quantitative research design and analysis, and scientific writing. Special emphasis will be placed on objective measurements of the human body and bodily functions prominent in the exercise sciences. Scientific writing is a significant component of the course. Meets the Graduation Writing Requirement for majors in Exercise Science.

## **EXSC 270 Nutrition for Fitness (3 credits)**

Prerequisite(s): NUFD 182 or NUFD 192. This course is designed to provide students a basic understanding of the role nutrition plays in enhancing one's health, fitness, and sport performance. Current research and practical activities are incorporated throughout. Students will learn the principles of healthy eating and its application to exercise for health and athletic performance. An enhanced discussion of the latest dietary trends for improvement of performance, such as ketogenic diets, plant-based proteins, and nutrient timings, will also be included in this course. Mutually Exclusive with NUFD 270.

## **EXSC 300 Seminar I in Exercise Science (2 credits)**

Prerequisite(s): EXSC 234. Restriction(s): Exercise Science majors only or department approval. This course provides the student with the knowledge and basic skills necessary to evaluate potential career choices in the exercise science and fitness industries. Students will visit and observe a variety of fitness related work sites and then apply this knowledge as they engage in real and practical leadership experiences while under the supervision of a fitness professional.

## **EXSC 331 Exercise Assessment and Prescription (4 credits)**

Prerequisite(s): PEMJ 320. Restriction(s): Exercise Science and Physical Education majors only. This course provides the student with the knowledge and basic skills necessary to support healthy individuals in adopting and maintaining healthy exercise behaviors. Students will learn to perform a variety of health and fitness evaluations prior to the development of individualized exercise recommendations tailored to the needs and goals of each client. The primary focus will be on exercise testing and exercise prescription for the general population to improve health outcomes.

## **EXSC 420 Theoretical Foundations of Sports Conditioning (3 credits)**

Prerequisite(s): EXSC 234 and PEMJ 320. Restriction(s): Exercise Science majors only. In this course students apply scientific principles and theories of strength and conditioning to enhance skills in developing training programs to optimize athletic performance. Students learn to utilize information from a needs analysis and fitness evaluation to determine and assign appropriate exercises following a periodized model. Additionally, students investigate the bioenergetics, biomechanics, and nutritional aspects of anaerobic training.

## **EXSC 430 Exercise for Special Populations (3 credits)**

Prerequisite(s): EXSC 331 for Exercise Science majors only; PEMJ 320 and departmental approval for Sports Nutrition minors only. Restriction(s): Exercise Science majors only. This course provides the student with the knowledge to apply principles of personalized fitness to individuals in special populations. Students examine responses to exercise and special considerations for individuals of varying age (children, older adults) and clinical conditions other than heart disease (arthritis, diabetes, dyslipidemia, hypertension, metabolic syndrome, obesity, osteoporosis, pregnancy, pulmonary disease). Emphasis is placed on preparing students to develop safe and effective exercise programs for individuals with special needs.

## **EXSC 475 Foundations and Practices in Cardiac Rehabilitation (3 credits)**

Prerequisite(s): EXSC 331. Restriction(s): Exercise Science majors only and departmental approval. This course provides the student with the knowledge and basic skills necessary for patient care in a cardiac rehabilitation setting. Students examine the underlying pathology of coronary disease and learn to apply concepts of exercise testing and exercise prescription to patients in this population. Substantial time is allotted to developing student competencies in electrocardiographic interpretation necessary for patient monitoring during exercise.

## **EXSC 476 Seminar in Exercise Science (3 credits)**

Prerequisite(s): EXSC 331. Restriction(s): Exercise Science majors only. Students will engage in career development, in order to make informed and appropriate occupational and educational decisions. Exercise Science majors will develop effective resume writing and interview skills, while they learn about the internship requirement. Students will gain knowledge of communication, behavioral and motivational techniques for those starting an exercise program. They will practice these skills while also learning the scope of practice for exercise professionals within a health and exercise facility.

**EXSC 480 Cooperative Exercise Science Field Experience (3-9 credits)**

Prerequisite(s): EXSC 476 and department approval (site specific requirements for co-op placements include EXSC 420 in a fitness facility; EXSC 430 in a clinical setting; or EXSC 430 and EXSC 475 in a hospital setting). Restriction(s): Exercise Science majors only. The cooperative experience offers the student an opportunity to work as a trainee with professionals in organizations and/or agencies.

**EXSC 536 Cardiovascular Exercise Physiology (3 credits)**

Prerequisite(s): PEMJ 320 or departmental approval. Students learn how the cardiac, vascular, and autonomic nervous systems function in an integrative manner during acute exercise, along with adaptations in these systems as a result of chronic exercise training. Where applicable, students observe neurocardiovascular responses to exercise in the human performance laboratory and discuss practical implications to a clinical or training setting.

**EXSC 537 Neuromuscular Exercise Physiology (3 credits)**

Prerequisite(s): PEMJ 320 or departmental approval. Students develop a comprehensive understanding of how the muscular and somatic nervous systems function in a coordinated manner during acute exercise, along with adaptations in these systems as a result of chronic exercise training. Additionally students analyze interactions between the neuromuscular and energy systems in the context of exercise-induced fatigue. Where applicable, students observe neuromuscular responses to exercise in the human performance laboratory and discuss practical implications to a clinical or training setting.

**EXSC 538 Metabolic and Respiratory Exercise Physiology (3 credits)**

Prerequisite(s): PEMJ 320 or departmental approval. Students learn how the metabolic, endocrine and respiratory systems function in an integrative manner during acute exercise, along with adaptations in these systems as a result of chronic exercise training. Where applicable, students observe physiologic responses to exercise in the human performance laboratory and discuss practical implications to a clinical or training setting.

**EXSC 540 Applied Sport Physiology (3 credits)**

Prerequisite(s): PEMJ 320, EXSC 538, or Department Approval. Students learn and apply knowledge and skills necessary to design a comprehensive training program for athletes and active individuals, while taking into account physiological variations in gender, age and medical status. Furthermore, students learn how to modify exercise sessions in different settings (heat, cold, altitude) to manage training integrity and mitigate risk of environmental-induced illness. Additionally, students study the physiological aspects of fatigue, employ sound nutritional strategies for training, and analyze the effects of ergogenic aids on athletic performance and health.

**EXSC 541 Advanced Exercise Assessment and Programming (3 credits)**

Prerequisite(s): PEMJ 320 or departmental approval. In this course students learn and apply knowledge and skills necessary to carry out advanced modes of assessment for aerobic fitness, muscular fitness and body composition. Students also become adept at implementing comprehensive health appraisal protocols, developing exercise programs for healthy and special populations, and applying sociological theories to optimize adherence to the exercise program. Population specific modifications to exercise programming are based on student understanding of disease-related physiological constraints, published research findings and industry guidelines.

**EXSC 542 Foundations of Cardiac Rehabilitation (3 credits)**

Prerequisite(s): PEMJ 320 or departmental approval. In this course students gain knowledge and basic skills necessary to guide patient care in a cardiac rehabilitation setting. Students examine the underlying pathology of coronary disease and learn to apply concepts of exercise testing and exercise prescription to a variety of patients in this population. Additionally, students spend substantial time developing competence in electrocardiographic interpretation necessary for patient monitoring during exercise. Equivalent course PEMJ 542 effective through Spring 2020.

**EXSC 543 Theoretical Foundations of Strength and Conditioning (3 credits)**

In this course students apply scientific principles and theories of strength and conditioning to enhance skills in developing training programs to optimize athletic performance. Students learn to utilize information from a needs analysis and fitness evaluation to determine and assign appropriate exercises following a periodized model. Additionally, students investigate the bioenergetics, biomechanics, and nutritional aspects of anaerobic training. Equivalent course PEMJ 543 effective through Spring 2020.

**EXSC 545 Advanced Clinical Assessment (3 credits)**

Prerequisite(s): PEMJ 320, EXSC 475 or EXSC 542, or Department Approval. In this course students learn how to apply findings from physiological, functional and diagnostic assessments to exercise programming in clinical populations. Students also become skilled in interpreting 12-lead electrocardiograms at rest and in an exercise test setting. Health status is evaluated from multiple perspectives to optimize safety and efficacy of exercise sessions. The clinical focus of this course is on individuals with cardiovascular disease, pulmonary disease or metabolic disease.

**EXSC 556 Neuromotor Basis of Movement (3 credits)**

Prerequisite(s): PEMJ 324 or departmental approval. Students learn about peripheral and central nervous system contributions to motor control and learning. Greater understanding of the roles of the spinal cord and brain regions is established through studying movement disorders related to these areas. Where applicable, students observe neuromotor responses to exercise in the human performance laboratory and discuss practical implications to training, performance and rehabilitation.

**EXSC 558 Seminar in Exercise and Sport Science (1 credit)**

Students and guests present research and topically relevant material related to exercise and sport science. Students engage in meaningful question-and-answers sessions and discussions on the presented material. May be repeated for a maximum of 4 credits.

**EXSC 561 Applied Biomechanics (3 credits)**

Prerequisite(s): BIOL 240, PEMJ 321 or Physics or Readings determined by the instructor. In this course students explore the role of biomechanical concepts in the study of human movement and its application to injuries, exercise, athletic performance, and movement disorders. Students examine the science of human motion, mechanics of body tissues, methods of biomechanical data collection, and analysis and application of biomechanical data. Furthermore, students gain experience in employing advanced technological methods and practical approaches to human movement evaluation and application of data. Equivalent course PEMJ 561 effective through Spring 2020.

**EXSC 580 Independent Study in Exercise Science (1-3 credits)**

Students pursue a study of a topic in exercise science, which may be outside the scope of regular curricular offerings or may be an extension of an existing course. May be repeated for a maximum of 3 credits.