

# Exercise Science (XSCI)

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## **XSCI 1003. Sport and Performance Psychology. 1 Hour.**

For students interested in psychological skills training. This course is designed to help students maximize their performance through mental skills training. In particular, this course will help students understand the building blocks for success, know what it means to be ready to play, and learn strategies to more effectively prepare for performance. This course is recommended for student-athletes, performing artists, musicians, and all other students looking to improve their performance. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Articulate an understanding of the building blocks for success in performance environments. 2. Explain the use of mental skills strategies used to improve mental readiness for performance. 3. Explain how performance enhancement strategies can translate to success in all aspects of life. 4. Demonstrate a variety of mental skills (e.g., goal setting, management of emotions, imagery focus plans, coping plans, self-talk strategies, performance routines, etc.).

## **XSCI 1025. Intro to Sports Medicine. 3 Hours.**

Designed for individuals interested in athletic training, physical therapy, orthopedics, coaching, or other physical education or fitness related careers, but open to all students. Includes the basics of sports medicine (prevention of injury, evaluation of injury, and management of injury) and lab component where students have hands-on, field experiences with athletic trainers and therapists. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe basic musculoskeletal anatomy. 2. Explain basic strategies for the prevention of athletic injury. 3. Discuss common athletic injuries. 4. Utilize basic techniques in the care of athletic injury. Course fee required. FA, SP.

## **XSCI 1340. Lifeguarding/First Aid. 3 Hours.**

Activity course for students interested in furthering their knowledge and skills in swimming and getting their lifeguard training as well as first aid. Instruction is given in water rescue, water safety and skills. This course includes the Red Cross Exam, and successful students will be Red Cross certified. Students must demonstrate proficiency in two basic strokes (American Crawl and breaststroke). **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the process of preventing potential threatening situations in a given scenario. 2. Determine appropriate action to an emergency in a given situation. 3. Apply the knowledge of the first aid procedures by assessing the level of intervention for administering care in a given situation. 4. Perform CPR/First Aid procedures in simulated life threatening and non-life-threatening situations. 5. Master all skills and academic curriculum associated with National Lifeguard Certification requirements. Course fee required. FA, SP.

## **XSCI 1543. First Aid / Resp Emergencies. 3 Hours.**

Designed for students desiring to learn about first aid, including instruction in the principles and practices in emergency care and first aid procedures for injuries and safety precautions. Successful completers will be certified through the American Red Cross in CPR and First Aid. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the process of preventing potential threatening situations in various scenarios. 2. Determine appropriate action in an emergency situation. 3. Assess emergent situations and apply knowledge of first aid procedures by deciding the level of intervention for administering care. 4. Perform CPR/First Aid procedures in simulated life threatening and non-life-threatening situations. FA, SP.

## **XSCI 2020. Introduction to Exercise Science. 3 Hours.**

For students interested in exercise science. Course surveys the anatomical, physiological, nutritional, psychological, biomechanical, and developmental foundations of exercise science as an academic discipline. Careers and professional responsibilities within the exercise science field are also a focus of this course. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe the disciplines and careers that comprise Exercise Science. 2. Describe the contemporary base of Exercise Science knowledge. 3. Define the basic terminology used in the exercise science disciplines. FA, SP.

## **XSCI 2025. Introduction to Occupational Therapy. 3 Hours.**

This course is designed to provide a broad overview of the profession and practice of occupational therapy. It introduces the roles and functions of occupational therapy practitioners in a variety of settings. Professional outlook, issues, career, and program preparation are discussed. This course is only offered online. **\*\*COURSE LEARNING OUTCOMES\*\*** At the successful conclusion of this course students will: 1. Demonstrate an understanding of the role of occupational therapy practitioners across settings. 2. Summarize the issues facing occupational therapy practice across settings. 3. Articulate the professional outlook and career opportunities for occupational therapy practitioners. 4. Identify common requirements for occupational therapy program admissions across the nation. FA, SU.

## **XSCI 2060. Sport and Exercise Psychology. 3 Hours.**

For students interested in sport and exercise psychology. A study of the effects of psychological factors on performance in sport and exercise settings, including, but not limited to motivation, stress, leadership, group/team dynamics, imagery, and concentration. Course also covers the effects of sport/exercise participation on psychological well-being. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain and differentiate the essential elements of personality, exercise environments, and group processes as related to sport performance and exercise adherence. 2. Explain and differentiate aspects of exercise and sport/activity participation as related to psychological effect (e.g., mood states, depression, and mental toughness). 3. Identify and develop methods of facilitating sport performance, exercise adherence, and psychological growth and development. 4. Synthesize information critical to the understanding of research in the field of sport psychology through cultural lenses scenarios. 5. Create a research study proposal that focuses on the discovery of new knowledge through a systematic approach utilizing scientific methodology. FA, SP.

**XSCI 2080. Management in Exercise & Health Promotion. 3 Hours.**

Course provides knowledge essential to the operation of fitness centers. Practical skills related to the management of commercial and corporate fitness/wellness centers will be the primary focus of this course. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Develop an understanding of the skills required to supervise employees in a fitness / wellness facility. 2. Demonstrate the knowledge and skill required to recruit and retain professional employees. 3. Demonstrate the knowledge and skill necessary to operate and maintain a fitness facility while maintaining profitability. 4. Demonstrate knowledge of the legal liabilities and responsibilities related to the operation of a fitness/wellness facility.

**XSCI 2120. Principles of Fitness and Lifestyle Management. 3 Hours.**

Emphasize issues relative to fitness in youth/adult fitness, aging, physical activity program design and implementation, attrition, behavior modification, and the role of exercise in disease prevention and/or management. The goal is to promote fitness across an entire lifespan. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the elements associated with a healthy lifestyle. 2. Identify the outcomes of healthy and unhealthy behaviors on the human body. 3. Identify cultural, demographic, gender, and socioeconomic factors associated with the development and maintenance of a healthy lifestyle. 4. Identify training techniques to optimize desired health-related fitness results, and minimize safety hazards. 5. Create a fitness training program based upon individualized goals. SP.

**XSCI 2200. Nutrition for Sport and Exercise. 3 Hours.**

This course provides an overview of the scientific foundations of sports nutrition. Areas of emphasis include basic nutritional concepts, energy expenditure during different types of exercise, optimal diets for various training and activities, timing and composition of pre and post competition meals, the use of nutritional supplements and ergogenic aids, and the specific needs of different athletic populations. The course can provide beneficial information to the recreational or competitive athlete, and to any individual wishing to incorporate nutrition in their active lifestyle. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the pathways to digestion and absorption of macro and micro nutrients at a developmental level. 2. Explain the different fuel systems for energy production and needs during physical activity at the introductory and developmental level. 3. Explain the effectiveness of nutritional supplementation and ergogenic aids. 4. Interpret human nutrition research and its application to exercise performance. SP.

**XSCI 2992. Seminar in Exercise Science. 0.5-3 Hours.**

For students wishing instruction that is not available through other regularly scheduled courses in this discipline. Occasionally, either students request some type of non-traditional instruction, or an unanticipated opportunity for instruction presents itself. This seminar course provides a variable credit context for these purposes. As requirements, this seminar course must first be pre-approved by the department chair; second, it must provide at least nine contact hours of lab or lecture for each credit offered; and third, it must include some academic project or paper (i.e., credit is not given for attendance alone). This course may include standard lectures, travel and field trips, guest speakers, laboratory exercises, or other nontraditional instruction methods. Note that this course in an elective and does not fulfill general education or program requirements. Fees may be required for some seminar courses and instructor permission will be optional at the request of the instructor. Repeatable up to 6 credits subject to graduation requirements. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Express original and creative ideas. 2. Collaborate with others to accomplish a shared purpose or goal. 3. Use appropriate strategies and tools to represent, analyze, and integrate seminar-specific knowledge. 4. Discuss and evaluate content from a critical thinking perspective. 5. Apply knowledge from seminar to a range of contexts, problems, and solutions.

**XSCI 2993. Seminar in Exercise Science. 0.5-3 Hours.**

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**XSCI 2994. Seminar in Exercise Science. 0.5-3 Hours.**

For students wishing instruction that is not available through other regularly scheduled courses in this discipline. Occasionally, either students request some type of non-traditional instruction, or an unanticipated opportunity for instruction presents itself. This seminar course provides a variable credit context for these purposes. As requirements, this seminar course must first be pre-approved by the department chair; second, it must provide at least nine contact hours of lab or lecture for each credit offered; and third, it must include some academic project or paper (i.e., credit is not given for attendance alone). This course may include standard lectures, travel and field trips, guest speakers, laboratory exercises, or other nontraditional instruction methods. Note that this course in an elective and does not fulfill general education or program requirements. Instructor permission will be optional at the request of the instructor. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Express original and creative ideas. 2. Collaborate with others to accomplish a shared purpose or goal. 3. Use appropriate strategies and tools to represent, analyze, and integrate seminar-specific knowledge. 4. Discuss and evaluate content from a critical thinking perspective. 5. Apply knowledge from seminar to a range of contexts, problems, and solutions.

**XSCI 3000. Psychophysiology of Fitness and Nutrition. 3 Hours.**

Provides students with an understanding of the interaction between psychological processes, nutritional practices and physiological adaptations associated with physical activity and nutritional practices. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe factors associated with wellness and physical activity. 2. Describe activity and nutritional behaviors which promote, maintain, and protect health and wellness. 3. Describe how affective states and cognitive processes are related to physiological measures such as ECG, EMG, VO<sub>2</sub>, respiratory fitness, and body composition. 4. Relate affective states and cognitive processes to nutritional practices. 5. Provide research evidence regarding the psychological and cognitive effects of acute versus chronic exercise. 6. Analyze research within the field of psychophysiology of fitness and nutrition. Prerequisites: XSCI 2060 & XSCI 2200 (grade C or higher).

**XSCI 3010. Cultural Anthropology for the Health Sciences. 3 Hours.**

The study of health, wellness, and fitness from an anthropological perspective. Course focuses on an understanding of the influences of culture, political/economic environments, and social factors on health behavior. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Demonstrate an understanding of diverse dimensions of cultural norms and behaviors related to health behaviors, wellness risks, and protective measures. 2. Appraise diversity in illness experience and social meanings of disease. 3. Analyze how biosocial factors relate to disease distribution and health disparities. 4. Create methods of effective interaction, when working with culturally diverse populations.

**XSCI 3052. Psychophysiology of Motor Control. 3 Hours.**

Surveys the basic principles of control of human movement, including neuro-mechanics of human movement. These principles will be taught through application to sport, joint movement, and activities of daily living. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe complex systems in terms of simplified, higher- order functions. 2. Apply motor control research to course material. 3. Describe neuromechanical factors of human movement and apply this knowledge to movement analysis. Prerequisite: XSCI 2020 or XSCI 1025.

**XSCI 3054. Motor Learning and Control. 3 Hours.**

Course surveys the basic principles related to the neuro-mechanisms and cognitive processes controlling human movement and contribution to the learning of motor skills. **\*\*COURSE LEARNING OUTCOMES (CLOs)\*\*** At the conclusion of this course students: 1) describing physiological properties of the musculoskeletal and neuromuscular system that relate to movement control; 2) describing the mechanical factors of human movement and applying this knowledge to movement analysis; 3) Identifying neurophysiological and behavioral principles of motor skill acquisition; 4) analyzing factors associated with motor learning theory (e.g., movement preparation, attention, arousal, and practice design); 5) applying motor learning and motor control principles. Prerequisites: XSCI 2020 or XSCI 1025 (Grade C- or higher). FA.

**XSCI 3080. Advanced Sports Medicine. 3 Hours.**

Advanced course for students who have successfully completed an Introduction to Sports Medicine course, or for individuals with previous experience in athletic training/sports medicine. Course includes field experience with athletic trainers. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Demonstrate how to take a thorough medical history. 2. Demonstrate basic assessment of range of motion techniques. 3. Describe the common mechanisms of injuries for upper and lower extremities. 4. Demonstrate basic orthopedic physical exam assessment techniques for upper and lower extremity injuries. 5. Recommend strategies for injury prevention. Prerequisites: HLOC 1020 or XSCI 1025 or instructor permission.

**XSCI 3350. Motor Learning and Development. 3 Hours.**

A study of how the development of physiological, perceptual, neurological, intellectual, and emotional factors affect motor learning. Knowledge from this course provides a framework for the establishment of programs that facilitate skill acquisition for all learners with a focus on children and adolescents. This course is required on most Exercise Science and/or Kinesiology degree plans. It is also a prerequisite for many graduate programs in Exercise Science, or physical/occupational therapy. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Distinguish how the disciplines of motor development, motor learning, and motor control interrelate in motor behavior across the lifespan. 2. Analyze aspects of physical growth and aging that affect the acquisition and maintenance of fitness and motor skills across the lifespan. 3. Analyze aspects of perceptual development that affect the acquisition and maintenance of fitness and motor skills across the lifespan. 4. Analyze social and cultural constraints associated with motor and fitness development across the lifespan. 5. Differentiate factors associated with motor learning theory (e.g., movement preparation, attention, arousal, practice design). 6. Research a selected topic, and apply new knowledge, in a practical way, to a contemporary issue in the field of health, physical education, or sport.

**XSCI 3352. Motor Development. 3 Hours.**

A study of how the development of physiological, perceptual, neurological, intellectual and emotional factors affect motor skill and fitness acquisition across the lifespan. **\*\*COURSE LEARNING OUTCOMES (CLOs)\*\*** At the conclusion of this course students will: 1) distinguishing how the disciplines of motor development, motor learning, and motor control interrelate in motor behavior across the lifespan; 2) analyzing aspects of perceptual, physical, cognitive, and social development that affect the acquisition and maintenance of motor skills and physical fitness across the lifespan; 3) describing environmental and task factors affecting motor development; 4) describing principles of typical and atypical growth and maturation to an understanding of motor skill acquisition; 5) applying knowledge of motor development to best practices for teaching and assessment. Prerequisites: XSCI 2020 OR XSCI 1025 (Grade C or higher). FA.

**XSCI 3370. Exercise Testing and Prescription. 3 Hours.**

Teaches key concepts related to exercise testing and program design for healthy and diseased populations. Furthermore, usage of teams, groups, and individualized assessment and programming based activities will be used to explore principles in anatomy, exercise physiology, behavior modification, motivation, health promotion, fitness assessment and prescription. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Identify effective strategies to assess risk and appropriately stratify individuals at the developmental level. 2. Identify a variety of fitness assessments on different adult populations on an introductory level. 3. Discuss the results from fitness assessments to prescribe safe and effective exercise. 4. Demonstrate knowledge, skills, and abilities to pass the ACSM certification examination. Prerequisites: XSCI 3700 and XSCI 3705 (Grade C- or higher). SP.

**XSCI 3400. Activity Programming for Special Populations. 3 Hours.**

A comprehensive look at providing high-quality fitness, physical education, sport, and outdoor adventure experiences for individuals with disabilities. Students will learn best practices and applications for inclusion in classroom settings, as well as discover how to develop individualized fitness, competitive sport, and outdoor adventure experiences for individuals with special needs. This course is required on most Exercise Science and/or Kinesiology degree plans. It is also pre-requisite for many graduate programs in Exercise Science. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the laws important to adapted physical education and sport. 2. Identify and differentiating specific developmental, behavioral, sensory, and orthopedic conditions. 3. Compare and contrast adapted physical activity services related to interscholastic models, and community-based models. 4. Implement appropriate curricular/activity programming. 5. Select appropriate venues for adapted athletic competition through investigative research, and student teaching presentations. Prerequisites: XSCI 2020 OR XSCI 1025 (Grade C or higher). FA.

**XSCI 3500. Theories and Techniques for Teaching Fitness and Motor Skills. 3 Hours.**

Content in this course will prepare students to design and implement quality physical education programs for elementary and secondary school students. In addition to developing the knowledge and skills to select and implement developmentally appropriate activities for children/adolescents, students enrolled in the course will also develop an understanding of curriculum design, public school policy and procedures (as related to P.E.), as well as national standards and guidelines affecting physical education programming. The curriculum is designed to meet the academic needs of Fitness trainers, community recreation directors, and physical education teachers in the public and private sector will benefit from the curriculum. In addition, the knowledge and skills developed in this course will address material covered in the Praxis exam. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the relationship of pediatric and adolescent physical activity patterns to lifespan health and wellness. 2. Identify essential elements of "Quality" Physical Education Programs. 3. Explain legal issues often associated with teaching fitness and motor skills to pediatric and adolescent in public and private school settings. 4. Demonstrate various techniques for teaching fitness and motor skills relative to theories associated with motor learning/development, and motivation. 5. Create an optimal learning environment for physical education students K-12th grades. Prerequisites: XSCI 2020 OR XSCI 1025 (Grade C or higher). FA.

**XSCI 3510. Applied Exercise Physiology. 3 Hours.**

Focuses on an applied perspective of exercise physiology, designed to provide physical educators, coaches, and exercise professionals with the scientific foundations of exercise pertaining to areas such as energy metabolism, cardiovascular and neuromuscular physiology, nutrition, etc. with direct application in schools, health clubs and sport settings. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Identify the physiological adaptations to exercise observed in the following systems: skeletal, neuromuscular, cardiovascular, respiratory system, and endocrine on an introductory level. 2. Identify the effects of nutritional status, fluid balance, environment, and ergogenic aids on exercise training on an introductory level 3. Explain knowledge of exercise fitness tests and be able to measure and evaluate factors such aerobic fitness, anaerobic fitness, muscular strength and endurance, and body composition on an introductory level. 4. Describe appropriate programs for the benefit of health and athletic performance on an introductory level.

**XSCI 3700. Physiology of Exercise. 3 Hours.**

This course provides a further overview of the physiology of exercise. It builds on the students' knowledge of human anatomy and physiology, and further focuses on the acute and chronic physiological adaptations of exercise on the human body. Various responses of functional systems, different populations, ergogenic aids, chronic diseases, physical activity, health and wellness, and environmental conditions will also be described from a physiological perspective. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain how each of the major organ systems (cardiovascular, respiratory, and musculoskeletal) responds to an acute bout of exercise. 2. Explain the adaptations that occur in each of the major organ systems to exercise training. 3. Explain the influence of environmental conditions and ergogenic factors on exercise physiology. 4. Interpret research topics in the field of exercise physiology and its application to exercise performance. Prerequisites: BIOL 2320 and BIOL 2325 (Grade C- or higher); and BIOL 2420 and BIOL 2425 (Grade C- or higher). Corequisite: XSCI 3705. FA, SP.

**XSCI 3705. Physiology of Exercise Lab. 1 Hour.**

A supplemental course to PEHR 3700, Physiology of Exercise. Emphasizes the demonstration of lecture concepts through hands on experiences. Assessments include maximal oxygen consumption, aerobic and anaerobic fitness assessment, body composition analysis, and pulmonary function testing in regards to chronic and acute exercise. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Investigate basic data collection and pretest screening on a developmental level. 2. Evaluate anaerobic and aerobic fitness. 3. Evaluate cardiovascular function and respiratory function on an introductory level. 4. Evaluate body composition. Prerequisites: BIOL 2320 and BIOL 2325 (Grade C- or higher); BIOL 2420 and BIOL 2425 (Grade C- or higher). Corequisite: XSCI 3700. FA, SP.

**XSCI 3730. Biomechanics. 3 Hours.**

Focuses on the investigation and application of the mechanical principles of movement relative to exercise and sport. Course includes an overview of the relationship of musculoskeletal anatomy to the mechanics of human movement. Methods of optimizing exercise and sport performance from a biomechanical perspective will also be addressed. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Apply mechanical analysis to biological systems. 2. Calculate basic kinematic and kinetic parameters. 3. Describe human movement in terms of muscle mechanics. 4. Adapt mechanical analysis to clinical and performance settings. Prerequisite: XSCI 2020 or XSCI 1025. FA (odd), SP.

**XSCI 3740. Clinical Biomechanics. 3 Hours.**

Provides an introduction to the mechanical principles relevant to the understanding of human motion in the context of clinical populations, movement pathologies, and therapy. The focus will be on the mechanics and anatomical geometry of human movement, as well as muscular control and mechanics. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe the temporal and kinematic features of basic human movements. 2. Compare normal motion to pathological motion and discuss biomechanical influences on the latter. 3. Apply qualitative analysis to joint mechanics during activities of daily living. 4. Explain the effects of weight, muscle, and neural activity on pain and altered movement strategies. 5. Explain and measure anatomical alignment and the human gait cycle. 6. Explain electromyography. Prerequisites: XSCI 2020 or XSCI 1025 and BIOL 2320 and BIOL 2325 and BIOL 2420 and BIOL 2425 (All grade C or higher).

**XSCI 3750. Quantitative Biomechanics. 3 Hours.**

This course is a quantitative approach to analyzing human movement using mechanical principles such as kinematic and kinetic analysis. The course will emphasize lab instrumentation such as high-speed videography, 3D motion capture, force platforms, and inertial motion units (IMU). Students will utilize analytical geometry and algebraic methods to produce analyses of human movement. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Analyze movement and anatomical influences thereon using vector algebra, free-body diagrams, and Newtonian mechanics. 2. Prepare the laboratory and test subjects for testing using a 3D motion capture system, force platforms, and other lab instrumentation. 3. Collect human movement data for analysis using lab instrumentation. 4. Analyze human movement through computer analysis (Excel, programming, etc.). 5. Produce an analysis of a human movement task, including a temporal description, measurement of key parameters, and a written report of results. Prerequisites: XSCI 2020 or XSCI 1025 and MATH 1050 or higher; or XSCI 3730; or XSCI 3740 (All grade C or higher). FA, SP.

**XSCI 3800. Measurement & Evaluation in Physical Exercise & Sports. 3 Hours.**

Provides students with the foundation of knowledge needed for administering and interpreting results from popular health and skill-related physical fitness tests. Test selection, administration, and interpretation will be emphasized. Students will use popular assessment instruments for data collection and computer analysis. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Measure basic quantities related to exercise science and sport, and performing basic, related calculations. 2. Evaluate and interpret research findings in exercise science disciplines. 3. Design basic studies, testing hypotheses, and reporting results. Prerequisites: XSCI 2020 or XSCI 1025.

**XSCI 3820. Sport Science and Technology. 3 Hours.**

This course explores the current state of science and technology in sport, both for performance and safety. Materials and design of equipment will be covered, as well as new technologies and instrumentation for tracking performance and risk factors. Additionally, the use of common technology such as "smartphones" and video will be explored. Basic computer software and methods for analyzing everyday sporting data with excel and other computing tools will be introduced. Students will be exposed to data collection and analysis using tools that are available to consumers, sport enthusiasts, and researchers. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Describe the basic instrumentation commonly used to acquire sport science data. 2. Utilize simple video tools to collect and analyze variables that may be of interest to spectators, coaches, or trainers. 3. Explain the evolution and development of equipment advances in sport--both from a safety and a performance standpoint. 4. Explain basic material properties that affect sporting equipment and game-play. 5. Evaluate consumer-available sensors and "smartphone" apps that are marketed to coaches and enthusiasts for athlete development. 6. Employ Excel and similar computing platforms for simple calculations and analysis of collected data.

**XSCI 3840. Measurement, Research, and Statistics in Exercise Science. 3 Hours.**

Provides students with a foundation in measuring and collecting data associated with human movement science. Additionally, provides an introduction to statistical methods and experimental design, necessary to evaluate data collected from measurements commonly used in exercise science, health, and human performance. Topics will include sampling, sampling distribution, descriptive statistics, correlation and regression, t-tests, and ANOVA as well as the use of statistical software for conducting such analyses. This course can be used as an elective and it can substitute for PEHR 3800. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Measure basic quantities related to exercise science and sport, and perform basic, related calculations. 2. Evaluate and interpret research findings in exercise science disciplines. 3. Design basic studies, testing hypotheses, and reporting results. 4. Test hypotheses using statistical methods to include correlation, regression, t-tests, and ANOVA. Prerequisite: XSCI 2020 or XSCI 1025 (Grade C or higher). FA.

**XSCI 4010. Health Coaching Concepts and Skills I. 3 Hours.**

This course focuses on the practical application of Health and Wellness coaching, targeting health coaching techniques and skills emphasizing the practical application through case studies, neurobiology and wellness coaching, motivational interviewing skills, behavior change model and understanding motivational techniques to promote healthy lifestyle changes. This course covers the coaching structure and understanding of the coaching process. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Apply active listening and empathy skills through best practices in wellness coaching communication. 2. Create client centered relationships. 3. Develop relationships with clients respective of their self-efficacy, values, and vision. 4. Evaluate the relationship between neurobiology and behavior change techniques. FA.



**XSCI 4020. Health Coaching Concepts and Skills II. 3 Hours.**

Complements coaching theory covered in XSCI 4010, skills, and techniques related to guiding individuals and groups through meaningful lifestyle changes by emphasizing the use of evidence-based coaching approaches. Using a mentor, self-assessment and peer feedback model, students practice, compare and contrast diverse coaching methodologies emphasizing motivational interviewing techniques and cultivating their coaching voice. Students are assigned coaching clients, schedule coaching sessions, follow-up with clients, practice professional boundaries setting, become acquainted with ethical issues and referral processes, and validate their knowledge and skills when working with people with chronic diseases who require lifestyle management strategies to improve their conditions. Program faculty will provide mentorship and feedback regarding student's coaching performance. Students practice practical skills. Scope of practice, ethics, and legal issues are taught. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Create an environment/culture for wellness coaching. 2. Demonstrate communication techniques emphasizing active listening, empathy, trust, reflections, expansion, re-focusing, techniques related to successful goal setting. 3. Design techniques for building client self-efficacy. 4. Construct various forms of constructive feedback. 5. Demonstrate professional ethics. Prerequisites: XSCI 4010 (Grade C- or higher). SP.

**XSCI 4100. Physiology and Techniques of Strength and Power. 3 Hours.**

Covers physiological principles and training techniques used in strength and conditioning. A large emphasis is placed on the guidelines from the National Strength and Conditioning Association (NSCA) with an aim for preparing students to ultimately take the NSCA Certified Personal Trainer or NSCA Certified Strength and Conditioning Specialist exam. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Apply scientific knowledge to train athletes for the primary goals of improving athletic performance and fitness on a developmental level. 2. Design and implement safe and effective strength training and conditioning and personal training programs at an introductory level. 3. Apply exercise prescription principles for training variation, injury prevention, and reconditioning. 4. Demonstrate the knowledge, skills, and abilities to pass the NSCA certification examination. Prerequisites: XSCI 3700 and XSCI 3705 (Grade C- or higher). SP.

**XSCI 4200. Healthy Aging. 3 Hours.**

Emphasizes the basic physiological changes in older adults. Methods to improve the quality of life among older adults will be stressed. Additional content will include elements of health promotion, wellness programming, behavior change, lifelong learning and development, and relevant research findings pertaining to older adults. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Outline the changes in major organ systems pertaining to the aging population. 2. Consider selected disease and their relationship to the aging population at the developmental level. 3. Interpret research topics in the field of the aging population. 4. Compile a review of current literature on relevant topics. Prerequisites: XSCI 3700 and XSCI 3705 (both grade C- or higher). FA.

**XSCI 4230. Applied Fitness Development for Aging and At-Risk Populations. 3 Hours.**

This course provides students with the knowledge and skills to develop and provide fitness programs for at-risk populations and older adults. Course objectives include health related fitness assessments, interpretation and counseling based on results of fitness assessments, and the construction of individually tailored exercise prescriptions to meet the clients' unique needs and goals. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Classify the current demographics in the US and the attitudes toward aging. 2. Discriminate the physiology of aging systems from young adults as well as and physical conditions requiring special consideration for exercise programming. 3. Analyze psychosocial barriers and applying psychosocial concepts to exercise programming (inclusive of cultural, demographic, gender, and socioeconomic factors) associated with the development and maintenance of a healthy lifestyle. 4. Design programming guidelines, including components of a fitness class, safety training techniques to optimize desired health-related fitness results, and minimize safety hazards. 5. Create a fitness training program based upon individualized goals. 6. Apply skills in community-based and senior living environments. Prerequisites: BIOL 2320 & BIOL 2325 & BIOL 2420 & BIOL 2425 (Grade C or higher) OR Instructor Permission. SP.

**XSCI 4300. Clinical Exercise Physiology. 3 Hours.**

Emphasizes information and skills related to exercise testing and prescription in healthy and clinical populations. Teaches American College of Sports Medicine (ACSM) exercise testing guidelines. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Outline the scope of practice and responsibilities of a clinical exercise physiologist. 2. Explain the pathophysiology of multiple disorders in the areas of cardiovascular, pulmonary, immune, neuromuscular, and metabolism. 3. Distinguish commonly used medications for specific clinical conditions and their effects on exercise capacity. 4. Adapt the limitations for physical activity in clinical populations, taking into consideration disease processes and methods to assess functional capacity. Prerequisites: XSCI 3700 and XSCI 3705 (Grade C- or higher). FA.

**XSCI 4400. Pediatric and Adolescent Fitness & Nutrition. 3 Hours.**

Provides future exercise science professionals with the knowledge, skills, and abilities to provide appropriate fitness and nutritional guidelines for the demands unique to children and adolescents. Techniques to evaluate milestones in this population will also be covered. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1: Analyze a child's capacity to exercise at the age-appropriate recommendation. 2: Describe pediatric and adolescent unique nutritional needs. 3: Identify developmental milestones used to assess health-related fitness and skills in children by using and comparing various assessment methods. 4: Design training and fitness programs tailored and optimized to meet the development needs of children and adolescents. 5: Evaluate the physical activity and nutritional needs of a child with a chronic disease and implement an appropriate intervention plan. Prerequisites: XSCI 2020 OR XSCI 1025, BIOL 2320 & BIOL 2325 & BIOL 2420 & BIOL 2425 (all Grade C or higher). SP.

**XSCI 4500. Theories of Behavioral Change. 3 Hours.**

Focuses on behavior change theory, principles, and predictive models, with their application to health behavior change programs and interventions. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Outline theories related to individual and group motivation. 2. Express how leadership theories can be used to create an optimal learning environment. 3. Develop appropriate, theory-driven intervention strategies for promoting a healthy lifestyle, through activity participation in given scenarios. 4. Synthesize information critical to the understanding of research in Behavioral Change through cultural lens scenarios. 5. Analyze and implement research for the development of optimal health promotion programs. Prerequisites: XSCI 2060 (Grade C or higher).

**XSCI 4600R. Exercise Science Internship. 1-3 Hours.**

Designed to provide students with hands-on professional experience in the field of exercise science. May be repeated for a maximum of 6 credits toward graduation. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Integrate classroom theory to real world decision making. 2. Develop increased proficiency in specific skills in relation to exercise science techniques. 3. Develop personal skills in communication, technology, teamwork, and quantitative reasoning. 4. Collaborate in professional operations and decision making. 5. Create relationships with professional role models and potential mentors. 6. Develop network of professional relationships and contact. Prerequisite: Minimum 20 credits completed in XSCI courses at 3000-level or higher and Instructor permission.

**XSCI 4700. Motivation and Coaching. 3 Hours.**

Course covers knowledge and theory related to coaching principles relative to sport psychology, sport pedagogy, and sport management. Also covers the integration of basic coaching skills into the work of health-care/fitness professionals to help clients achieve self-determined goals related to health and wellness. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Outline theories related to individual and group motivation. 2. Integrate leadership theories in creating an optimal learning environment. 3. Assess research related to leadership in sport, exercise, fitness, and health promotion, through activity participation in class discussions, and research abstract presentations at the developmental level. 4. Compile information critical to the understanding of research in Motivation and Coaching through cultural lenses scenarios. 5. Outline the components of effective leadership, through class discussions and scenarios. Prerequisites: XSCI 2060 & XSCI 2120 (Grade C or higher).

**XSCI 4890R. Undergraduate Research for Exercise Science. 1-3 Hours.**

Provides students the opportunity to conduct research under the mentorship of a faculty member. Students will put in practice the theoretical knowledge gained in prior major courses. Students will create a significant intellectual or creative product that is characteristic of the Exercise Science discipline and worthy of communication to a broader audience. May be repeated for a maximum of 6 credits toward graduation. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Design a research study based upon existing literature in the field. 2. Prepare a research study proposal and qualify for the human subject's research certification as well as Institutional Review Board approval. 3. Prepare and execute a data collection according to a research study design protocol. 4. Analyze collected data and test study hypotheses. 5. Compose and prepare for dissemination the findings of a research study. Prerequisite: Instructor permission required. FA, SP, SU.

**XSCI 4910R. Study Abroad in Exercise Science. 3 Hours.**

This three-credit undergraduate-level course provides students a once in a lifetime opportunity to participate in a multi-week study abroad program led by the Exercise Science program at Utah Tech University. Designed for students who want more hands-on emphasis and experiences regarding human physiological adaptations at differing environments while incorporating elements of independent research, data collection, data testing, data assessment, and international travel. For international travel, see [studyabroad.utahtech.edu](http://studyabroad.utahtech.edu) for additional travel costs that may apply. **\*\*COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course, students will be able to: 1. Explain the major changes that occur to human physiology during rest and exercise at varying locations and environments. 2. Collect sample data regarding physiological adaptations at varying locations and environments. 3. Analyze collected data regarding physiological adaptations at varying locations and environments. 4. Interpret collected data and explain the relevance of findings in relationship to the field of exercise science.