

Exercise Science and Nutrition (MS) Student Learning Outcomes:

- 1) Exhibit mastery of foundational and supporting areas of exercise science and nutrition, resulting in safe and effective exercise programming.
- 2) Demonstrate proficiency in clinical-based testing (clinical track) or advanced athletic performance-based testing (performance track).
- 3) Develop ability to access, evaluate, and disseminate scientific evidence.
- 4) Provide active and meaningful participation in affiliated clinical or performance-based settings while adhering to the Code of Ethics as defined by the ACSM (clinical track) or NSCA (performance track) professional organizations.

Table 1 outlines the goals we expect each exercise science student will achieve as well as how each of the objectives will be assessed throughout the Exercise Science and Nutrition Master's program.

Table 1. Exercise Science and Nutrition Goals and Assessment Methods

Goal	Track	Objective	Course	Assessment Method
1) Exhibit mastery of foundational and supporting areas of exercise science and nutrition, resulting in safe and effective exercise programming	Both tracks	Students will demonstrate mastery in the governing laws of thermogenics as well as processes that govern macronutrient metabolism.	401	Quizzes, Exams, Research Briefs
			523-C	Exams, Research Essays
			524-C	Quizzes, Examinations
			531-P	Exams
			533-P	Exams
			562/563	Comprehensive Exams
			564/565	Comprehensive Exams
		Students will outline the anatomical features of the cardiovascular system, as well as describe homeostatic and limiting mechanisms	401	Quizzes, Exams, Research Briefs and Essays
			412	Minimally Assessed
			524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
			564/565	Comprehensive Exams
		Students will outline the anatomical features of the pulmonary/ventilatory system, as well as describe homeostatic and limiting mechanisms	401	Quizzes, Exams, Research Briefs and Essays
			412	Minimally Assessed
			524-C	Quizzes, Exams and Oral Presentation (2)
			562/563	Comprehensive Exams
			564/565	Comprehensive Exams
		Students can describe methodologies, validity, and reliability for a variety of body composition methodologies, including skinfolds, bioelectrical impedance, and whole-body air displacement plethysmography	401	Quizzes, Examinations
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams

		Students will outline the macro and microanatomical features of skeletal muscles, as well as describe theories regarding contraction and plasticity in response to physical training, disuse, or disease	402	Quizzes, Exams, Research Briefs and Essays
			412	LAB Assignment Exams , Exams and Oral Presentation (1)
			521-C	Quizzes, Examinations and Oral Presentation (1)
			533-P	Exams
			534-P	Exams, Oral Presentations
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students will describe the acute and chronic effects of exercise on the endocrine system, as well as endocrine-mediated adaptations to exercise	402	Quizzes, Exams, Research Briefs and Essays
			521-C	Quizzes, Exams and Oral Presentation (1)
			523-P	
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students can describe the acute effect and adaptive responses to environmental stressors such as heat, cold, altitude, and microgravity.	402	Quizzes, Exams, Research Briefs and Essays
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students will outline the anatomical features and functions of the gastrointestinal system, as well as describe homeostatic and control mechanisms related to hunger, satiation, and satiety	401	Quizzes, Exams, Research Briefs and Essays
			412	Not Assessed
			562/563	Comprehensive Exams
			564/565	Comprehensive Exams
		Students can provide an overview of all primary nutrition related risk factors for cardiovascular disease	404	Graded Participation, Exams, Research Briefs
			523-C	Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students can provide an overview of all primary nutrition related risk factors for breast, prostate, and colon cancer	404	Graded Participation, Exams, Research Briefs
			523-C	Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students can provide an overview of all primary nutrition related risk factors for osteoporosis	404	Graded Participation, Exams, Research Briefs
			523-C	Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams

		Students can provide an overview of all primary nutrition related risk factors for neurodegenerative diseases	404	Graded Participation, Exams, Research Briefs
			523-C	Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students can provide an overview of all primary nutrition related risk factors for type II diabetes/insulin resistance	404	Graded Participation, Exams, Research Briefs
			523-C	Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students can explain multiple prominent theories regarding the current obesity epidemic, as well as treatment outcomes	404	Not assessed
			523-C	Exams, Research Briefs
			562/563	Comprehensive Exams
		Students will be able to outline common nutritional deficiencies and toxicities seen in athletic or clinical settings	523-C	Exams
			531-P	Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Students will have the ability to provide a variety of alternate food choices for mock clientele seeking nutritional counseling (i.e., wide knowledge of food independent of nutrition)	404	Mock counseling assignments – minimally assessed
		Analyze and describe human movements in anatomical terms (motions, planes, axes, osteokinematics and arthrokinematics)	412	Lab Assignment Exams, Exams and Oral Presentation (1)
			534-P	Lab Assignment, Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Identify and locate key anatomical structures as they pertain to specific motions/movements and physical skills (bones, muscles, connective tissues, attachments, nerves)	412	Lab Assignment Exams, Exams and Oral Presentation
			534-P	Lab Assignment, Exams
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Describe the etiology and scope of selected pathologies and injuries and their effects on specific body regions during select physical activities and functions	412	Exams and Oral Presentation
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Analyze results of and identify the anatomical structures assessed during select musculoskeletal tests	412	Lab Assignment Exams, Exams and Oral Presentation
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Select appropriate conditioning and re-conditioning exercises for improving strength, flexibility, stability and physical function	412	Examinations and Oral Presentation (1)
			562/563	Comprehensive Exams
			565/565	Comprehensive Exams
		Identify and develop professional skills associated with the exercise	411	Provision of Health Promotion

		science profession including professionally oriented writing, oral presentations, and health and fitness promotion		Service/Activity
		Identify and develop professional networking skills within and outside of the university	411	Attendance and written report of professional meeting
Clinical only		Students can discuss the rationale, efficacy, and side effects of popular herbal and non-herbal supplements	523-C	Exams
			562/563	Comprehensive Exams
		Students can provide argument for the safety of genetically modified organisms	523-C	Exams
			562/563	Comprehensive Exams
		Students can develop and administer exercise programs designed to enhance cardiorespiratory fitness, muscular strength and endurance, balance, and range of motion for patients/clients challenged with cardiovascular, pulmonary, metabolic, orthopedic, musculoskeletal, neuromuscular, neoplastic, immunologic, or hematologic diseases and in apparently healthy individuals	521-C	Exams and Oral Presentation and Comprehensive Exam
			524-C	Exams and Oral Presentation (3), and Comprehensive Exam
			562/563	Comprehensive Exams
		Demonstrate effective listening and communication skills for helping people change behavior	522-C	Exams
		Apply health behavior change models to physical activity promotion and rehabilitation	522-C	Exams, Behavioral Theory Paper
		Understand barriers to, and enablers for, exercise among specific populations (e.g. women, children, patients in clinical settings, ethnic and racial minorities)	522-C	Exams
		Synthesize research findings from individual, interpersonal, community, environment, and policy levels as they apply to physical activity determinants and interventions	522-C	Exams, Behavioral theory Paper
		Develop the ability to understand and interpret key findings from results of specific diagnostic tests, pre-activity screening evaluations and clinical and field-based physical performance tests	521-C	Exams and Comprehensive Exams
			562/563	Comprehensive Exams
		Describe and demonstrate proper procedures for administering pre-activity screenings, risk-factor assessments and tests	521-C	Exams
			562/563	Comprehensive Exams
		Describe and explain the effect(s) disease stage/category, progression, medical management and medications have on physical activity tolerance and on physiologic responses to exercise	416	Quizzes, Tests
			521-C	Exams, Oral Presentation (1)
			562/563	Comprehensive Exams
		Identify general and disease-specific indications, contraindications, "red flags" and termination criteria for administering clinical and field-based functional tests	521-C	Exams and Oral Presentation and Comprehensive Exams
			562/563	Comprehensive Exams
		Determine specific exercise program goals and select appropriate outcomes measurement tools for clients with specific, co-morbid medical conditions (e.g., arthritis, osteoporosis, back pain, Parkinson's disease, and Multiple Sclerosis)	521-C	Exams and Oral Presentation (1)
			562/563	Comprehensive Exams
		Identify appropriate modifications to exercise program development and pre-activity testing and screening procedures for persons with co-morbid conditions like low back pain, arthritis, osteoporosis,	521-C	Exams and Oral Presentation
			562/563	Comprehensive Exams

		Parkinson's Disease, and Multiple Sclerosis)		
		Explain/identify the role and scope of the clinical exercise physiologist as a member of an interdisciplinary team of allied health professionals	521-C	Exams
			562/563	Comprehensive Exams
		Provide an overview of the pathophysiology of cardiovascular, pulmonary, metabolic and some common co-morbid diseases and disorders as they pertain to the exercise response and to physical function	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Describe and employ specific methods and assessment tools to determine and stage the severity of cardiovascular, pulmonary, metabolic and related diseases	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Describe common laboratory and field based exercise tests as they pertain to persons with cardiovascular, pulmonary, metabolic, related diseases and disorders	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Discuss "disease management" and "exercise" information needs and provide appropriate educational interventions for persons with cardiovascular, pulmonary and metabolic diseases and disorders	524-C	Exams and Oral Presentation (3) and Comprehensive Exam
			562/563	Comprehensive Exams
		Provide methods to facilitate the assessment and interpretation of 12 lead EKG rhythm strips, pulmonary function tests, pre-exercise physical examinations and disease specific symptom and disease impact ratings	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Identify and describe appropriate goals, strategies and modifications to facilitate the development of safe and effective exercise prescriptions for persons with cardiovascular, pulmonary, metabolic and related diseases and disorders	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Describe and employ methods to enhance patient/client supervision/observation, communication and effort/symptom monitoring during clinical testing and exercise sessions	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Describe and determine appropriate exercise program outcomes and methods to measure them in persons with cardiovascular, pulmonary, metabolic and related diseases and disorders	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Identify pathological processes associated with cardiovascular diseases including coronary artery disease and congestive heart failure	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Identify and distinguish between procedures and tests to diagnose and add details to CVD related conditions	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Identify and distinguish between commonly prescribed and related medications within the context of exercise responses including relevant side effects	416	Quizzes, Tests
			524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Identify and distinguish between heart rate and rhythm responses to exercise as well as infarction, ischemia, and paced rhythms via 3 and 12 lead EKG interpretation	524-C	Exams, Oral Presentation, and Demonstration, Comprehensive Exam

			562/563	Comprehensive Exams
		Distinguish between exercise prescription strategies for all phases of cardiac rehabilitation including congestive heart failure, ventricle assist devices, and heart transplant patients	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Analyze approaches to cardiopulmonary training, resistance training, return to sport or vocation related training within a clinical exercise context	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Analyze exercise prescription and programming strategies associated with common comorbid conditions with special attention paid to cancer and metabolic disease	524-C	Exams and Oral Presentation (3), Comprehensive Exam
			562/563	Comprehensive Exams
		Analyze supporting health related services in cardiac rehabilitation and preventive settings including nutrition and stress management/group support interventions	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Demonstrate proficiency in skills associated with exercise prescription and programming for cardiovascular and related diseases and conditions	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Address professional aspects associated with cardiac rehabilitation including a historical perspective, present challenges, and future trends within the broader context of allied health	524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
	Performance only	Students can discuss the rationale, efficacy, and side effects of popular dietary supplements marketed as ergogenic aids	531-P	Exams
			564/565	Comprehensive Exams
		Students can outline acute and chronic exercise's effects on nutrient requirements and fluid needs	531-P	Exams
			564/565	Comprehensive Exams
		Students can provide mechanisms explaining the Female Athlete Triad	531-P	Exams
			564/565	Comprehensive Exams
		Students will demonstrate an intimate knowledge of planar (2D) and three-dimensional kinematics as it applies to the analysis of human movement.	534-P	Exams
		Students will demonstrate an intimate knowledge of the kinetics of human movement. This includes the computation of forces and moments, both internal and external, that produce/prevent movement.	534-P	Exams
		Students will demonstrate an understanding of the importance and determination of body segment properties as it relates to biomechanics (anthropometrics).	534-P	Lab Assignment, Exams
		Students will demonstrate an appreciation of the mathematical principles enabling three-dimensional motion data collection.	534-P	Lab Assignment, Exams
		Student will be able to understand and appreciate the leading theories in sport psychology as it pertains to the coaching field	532-P	Quiz
		Student will be able to understand and appreciate the application of motivational theory	532-P	Quiz

		Student will be able to effectively coach skill development and structure practices	532-P	Quiz
		Student will be able to understand the fundamental principles of sports medicine as they pertain to the care and prevention of both acute and non-acute injuries	532-P	Assessed Mock Plan of Action
		Student will be able to appreciate differences in skill learning and motivational strategies for athletes of differing training backgrounds, age, gender and disability.	532-P	Quiz
		Student will be able to appreciate the philosophies and teaching styles of successful coaches in order to synthesize successful coaching strategies into the student's current philosophy	532-P	Observational Case Study (40 hours)
		Student will be able to effectively organize and plan micro, meso, and macrocycles in order to optimize athletic performance	533-P	Lab Assignment, Exams, Presentation
		Students can argue for or against the utility of various performance tests	533-P	Lab Assignment, In-Class Discussion/Debate, Presentation
		Students can defend multiple sides of well-documented controversies in the strength and conditioning field	533-P	Lab Assignment, In-Class Discussion/Debate
		Students will apply and defend the use of particular technologies for athlete feedback	533-P	Lab Assignment, In-Class Discussion/Debate, Exams
2) Demonstrate proficiency in clinical-based testing (clinical track) or advanced athletic performance-based testing (performance track)	Both tracks	Students will demonstrate the ability to set-up an exercise test using open circuit, indirect calorimetry	401	Laboratory Activity – not assessed
		Students will demonstrate the ability to use a variety of body composition methodologies, including skinfolds, bioelectrical impedance, and whole-body air displacement plethysmography	401	Laboratory Activity – not assessed
			411	Provision of Health Promotion Service/Activity
		Students will be able to run a lactate threshold test, as well as interpret the results	401	Laboratory Activity – skill not assessed ; interpretation assessed via laboratory assignment
		Students will be able to design and implement appropriate training regimes for elite endurance athletes and the underfit and/or overweight endurance athlete	414	Exam, Case Study
	Clinical only	Students will be able to conduct pre-participation health screening for patients and clients challenged with cardiovascular, pulmonary, metabolic, orthopedic, musculoskeletal, neuromuscular, neoplastic, immunologic, or hematologic diseases	521-C	Exams and Oral Presentation and Comprehensive Exam
			524-C	Exams and Oral Presentation (3), Comprehensive Exam
		Students will be able to perform maximal and submaximal graded exercise tests for patients and clients challenged with cardiovascular, pulmonary, metabolic, orthopedic, musculoskeletal, neuromuscular, neoplastic, immunologic, or hematologic diseases	521-C	Exams, Oral Presentation and Demonstration
			524-C	Exams, Oral Presentation (3), and Demonstration
		Students will be able to perform strength, flexibility and body composition tests for patients and clients challenged with	521-C	Exams, Oral Presentation and Demonstration

		cardiovascular, pulmonary, metabolic, orthopedic, musculoskeletal, neuromuscular, neoplastic, immunologic, or hematologic diseases and in apparently healthy individuals and athletes	524-C	Exams, Oral Presentation and Demonstration
		Students will be capable of providing exercise and physical activity counseling/education to clients/patients about testing, exercise program components, and clinical and lifestyle self-care for control of chronic disease and health conditions	521-C	Oral Presentation
			522-C	Exams, Comprehensive exams
			524-C	Exams and Oral Presentation (3)
		Students can outline procedures for proper exercise supervision for patients and clients challenged with cardiovascular, pulmonary, metabolic, orthopedic, musculoskeletal, neuromuscular, neoplastic, immunologic, or hematologic diseases	521-C	Exams and Comprehensive Exams
			524-C	Exams and Oral Presentation (3)
			562/563	Comprehensive Exams
		Students can appropriately measure and evaluate exercise/ physical activity assessment related outcome measures	521-C	Exams
			522-C	Exams, Comprehensive Exams
			524-C	Exams and Oral Presentation
			562/563	Comprehensive Exams
		Demonstrate effective listening and communication skills for helping people change behavior	522-C	Exams
		Demonstrate proficiency in skills associated with EKG interpretation and monitoring	524-C	Exams, Demonstration, Comprehensive Exam
			562/563	Comprehensive Exams
	Performance only	Perform the Functional Movement Screen and all tests of the NFL combine.	533-P	Lab Assignments and Exams
			415	Practical Exam
3) Develop ability to access, evaluate, and disseminate scientific evidence	Both tracks (access)	Students can use Google.Scholar and Pubmed to search for peer-reviewed articles related to their topic of interest. Students can also search websites from government and professional organizations for credible information	401	Research Briefs and Essays
			402	Research Briefs and Essays
			403	Literature Search Lab, Developing a Research Question assignment, Research Proposal, Exams
			404	Research Briefs and Essays
			411	Provision of Health Promotion Service/Activity
			412	Oral Presentation
			413	Health Advocacy Paper
			521-C	Assessed in Oral Presentation
			522-C	Behavioral Theory Paper
			523-C	Research Briefs and Essays
			524-C	Oral Presentation (3)
			531-P	Research Briefs and Essays
			533-P	Lab Assignments, In-class Discussion/Debate, Presentation

			534-P	Case Report and Presentation
			560/561	Thesis Proposal and Defense Paper and Presentation
			562/563	Research Based Written Briefs (6)
			564/565	Weekly Assignments, Presentation
	Both tracks (evaluate)	Students can distinguish between primary, secondary, and tertiary sources. Students can identify credible sources of health information. Students can identify strengths and weaknesses of peer reviewed research articles	401	Short Essays/ Research Briefs
			402	Research Briefs and Essays
			403	Literature Search Lab, Minimum of 8 Article Critiques, Research Proposal, Exams, Comprehensive Exams
			404	Research Briefs and Essays
			411	Provision of Health Promotion Activity/Service
			414	Health advocacy Paper
			521-C	Minimally Assessed during Oral Presentation
			522-C	Article Discussions, Behavioral Theory paper
			523-C	Research Briefs and Essays
			524-C	Oral Presentation (3)
			531-P	Research Briefs and Essays
			533-P	Lab Assignments, In-class Discussion/Debate, Presentation
			534-P	Case Report and Presentation
			560/561	Thesis Proposal and Defense Paper and Presentation
			564/565	Weekly Assignments
		Students can provide argument for and against the various methodologies of dietary intake assessments used in nutrition research	404	Exams
	Both tracks (disseminate)	Students can clearly present scientific findings through written and oral presentations	401	Research Briefs and Essays (written only)
			402	Research Briefs and Essays (written only)
			403	Literature Search Lab, Literature Review Outline, Article Critiques, Research Proposal Paper and Presentation

			404	Research Briefs and Essays (written only)
			411	Provision of Health Promotion Activity/Service
			412	Oral Presentation
			413	Health advocacy Paper
			521-C	Oral Presentation
			522-C	Behavioral Theory Paper
			523-C	Research Briefs and Essays (written only)
			524-C	Oral Presentation (3)
			531-P	Research Briefs and Essays (written only)
			533-P	Lab Assignments, Presentation
			534-P	Case Report and Presentation
			560/561	Thesis Proposal and Defense Paper and Presentation
			564/565	Presentation
4) Provide active and meaningful participation in affiliated clinical or performance-based settings while adhering to the Code of Ethics as defined by the ACSM (clinical track) or NSCA (performance track) professional organizations	Both tracks	Students will engage in at least 500 hours of active participation in clinical or sports performance settings	562/563	Site Monitoring verification
			564/565	Site Monitoring verification
		Students will refer to the Code of Ethics as outlined by the ACSM (clinical) or NSCA (performance).	564/565	Clinical Site Evaluations
		Students will understand the knowledge, skills, and abilities associated within the scope of the discipline, understand what information is confidential and preserve such confidentiality, respect the rights, welfare, and dignity of all clients/patients, and know when to refer clients/patients to appropriate health care personnel	411	Provision of Health Promotion Activity/Service
			564/565	Weekly Assignments, Internship End of Experience Evaluation, Clinical Site Evaluations
		Students will comply with all applicable state, local, and federal laws, as well as conduct themselves personally and professionally	411	Provision of Health Promotion Activity/Service
			562/563	Research Based Written Briefs (6)
			564/565	Weekly Assignments, Internship End of Experience Evaluation
		Students will seek education outside of the academic classroom, most notably at professional conferences	n/a	Not assessed

When applicable:

C = Courses taken by clinical track students only

P = Courses taken by performance track students only