

George Mason University
College of Education and Human Development
Kinesiology

KINE 410.002 - Exercise Physiology II
3 Credits, Fall 2019

Tuesday, Thursday/12:00-1:15pm, Katherine G. Johnson Hall 249- SciTech Campus

Faculty

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Prerequisites/Corequisites

BIOL 124, BIOL 125, ATEP 300, KINE 310

University Catalog Course Description

Provides study in the advanced theory of exercise physiology. Knowledge related to the physiologic, neuroendocrine, and biochemical changes of the human body associated with both a single bout of exercise and chronic exercise training will be addressed.

Course Overview

Material for the course will be drawn from the required textbook and assigned readings of published research. Class lectures will be presented in PowerPoint with handouts posted on Blackboard in advance of class meetings.

Course Delivery Method

This course will be delivered using a lecture, lab and seminar format.

Learner Outcomes or Objectives

This course is designed to enable students to do the following:

1. Discuss the dynamics of the bioenergetic, cardiorespiratory, neuromuscular, and endocrine systems
2. Describe advanced physiologic responses to acute and chronic physical activity
3. Identify common nutritional ergogenic aids, the purported mechanism of action, and any risk and/or benefits

Professional Standards (Commission on Accreditation of Allied Health Education Programs)

(CAAHEP))

Upon completion of this course, students will have met the following professional standards:

Knowledge-Skill-Ability (KSA)	Description	Lecture, Lab, or both
	GENERAL POPULATION/CORE: EXERCISE PHYSIOLOGY AND RELATED EXERCISE SCIENCE	
1.1.9	Ability to describe the systems for the production of energy.	Lecture
1.1.10	Knowledge of the role of aerobic and anaerobic energy systems in the performance of various physical activities.	Both
1.1.11	Knowledge of the following cardiorespiratory terms: ischemia, angina pectoris, tachycardia, bradycardia, arrhythmia, myocardial infarction, claudication, dyspnea and hyperventilation.	Lecture
1.1.12	Ability to describe normal cardiorespiratory responses to static and dynamic exercise in terms of heart rate, stroke volume, cardiac output, blood pressure, and oxygen consumption.	Both
1.1.13	Knowledge of the heart rate, stroke volume, cardiac output, blood pressure, and oxygen consumption responses to exercise.	Both
1.1.14	Knowledge of the anatomical and physiological adaptations associated with strength training.	Lecture
1.1.16	Knowledge of the common theories of muscle fatigue and delayed onset muscle soreness (DOMS).	Both
1.1.17	Knowledge of the physiological adaptations that occur at rest and during submaximal and maximal exercise following chronic aerobic and anaerobic exercise training.	Lecture
1.1.18	Knowledge of the differences in cardiorespiratory response to acute graded exercise between conditioned and unconditioned individuals.	Lecture
1.1.19	Knowledge of the structure and function of the skeletal muscle fiber.	Lecture
1.1.20	Knowledge of the characteristics of fast and slow twitch muscle fibers.	Lecture
1.1.21	Knowledge of the sliding filament theory of muscle contraction.	Lecture
1.1.22	Knowledge of twitch, summation, and tetanus with respect to muscle contraction.	Lecture
1.1.26	Knowledge of the response of the following variables to acute static and dynamic exercise: heart rate, stroke volume, cardiac output, pulmonary ventilation, tidal volume, respiratory rate, and arteriovenous oxygen difference.	Lecture
1.1.27	Knowledge of blood pressure responses associated with acute exercise, including changes in body position.	Lecture

1.1.29	Knowledge of and ability to describe the physiological adaptations of the pulmonary system that occur at rest and during submaximal and maximal exercise following chronic aerobic and anaerobic training.	Lecture
1.1.30	Knowledge of how each of the following differs from the normal condition: dyspnea, hypoxia, and hyperventilation.	Lecture
	GENERAL POPULATION/CORE EXERCISE PRESCRIPTION AND PROGRAMMING	
1.7.16	Knowledge of special precautions and modifications of exercise programming for participation at altitude, different ambient temperatures, humidity, and environmental pollution.	Lecture
	GENERAL POPULATION/CORE: NUTRITION AND WEIGHT MANAGEMENT	
1.8.1	Knowledge of the role of carbohydrates, fats, and proteins as fuels for aerobic and anaerobic metabolism.	Lecture
1.8.14	Knowledge of common nutritional ergogenic aids, the purported mechanism of action, and any risk and/or benefits (e.g., carbohydrates, protein/amino acids, vitamins, minerals, herbal products, creatine, steroids, caffeine).	Lecture
	GENERAL POPULATION/CORE: SAFETY, INJURY PREVENTION, AND EMERGENCY PROCEDURES	
1.10.6	Knowledge of the effects of temperature, humidity, altitude, and pollution on the physiological response to exercise and the ability to modify the exercise prescription to accommodate for these environmental conditions.	Lecture

Required Texts

McArdle, W.D., Katch, F.I, and Katch, V.L. (2014). *Exercise Physiology: Nutrition, Energy, and Human Performance*, 8th edition. Lippincott, Williams & Wilkins.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

- **Assignments and/or Examinations**

Written Examinations (3) (50%)

Exams will be T/F, multiple choice and short answer.

Lab Reports (25%)

Lab reports will be written in response to each lab activity. Specific questions will be given for students to address

Quizzes (20%)

Quizzes will be delivered online and will be T/F and multiple choice format

- **Other Requirements**

Professionalism (5%)

Kinesiology students are expected to behave in a professional manner. Depending upon the setting professionalism may appear different, but typically consists of similar components. For undergraduate Kinesiology students in a classroom setting professionalism generally comprises the following components:

Attendance – *Show up on time to class and pay attention. If you cannot attend a class for a legitimate reason please notify the instructor ahead of time. If you have to unexpectedly miss a class due to something out of your control, contact the instructor within 24 hours to notify them what happened and to see if there is anything you need to do to make up your absence.*

Communication – *When communicating with the instructor and classmates, either face-to-face or via the assigned George Mason University email address, students should address the other person appropriately, use appropriate language and maintain a pleasant demeanor.*

Participation – *Participate in class discussions and activities. Demonstrate that you have an interest in the subject matter.*

Responsibility/Accountability – *Professionals take responsibility for their actions and are accountable. This can occur at multiple levels but generally consists of completing assignments on time, submitting work that is of the appropriate quality, honoring commitments and owning up to mistakes.*

Honesty/Integrity – *Students are expected to be honest with the instructor, classmates and themselves. Professionals keep their word when committing to something and act in an ethical manner.*

Self-Improvement/Self-awareness – *One should be aware of their strengths/weaknesses and constantly seek to improve. Professionals regularly seek out opportunities to increase their knowledge and improve their current skill set.*

- **Grading**

A = 94 – 100	B+ = 87 – 89	C+ = 77 – 79	D = 60 – 69
A- = 90 – 93	B = 84 – 86	C = 74 – 76	F = 0 – 59
	B- = 80 – 83	C- = 70 – 73	

Final letter grades do not round up. For example, a final percentage of 89.99% will result in a B+.

Professional Dispositions

See <https://cehd.gmu.edu/students/policies-procedures/>

Students are expected to exhibit professional behaviors and dispositions at all times.

Students are held to the standards of the George Mason University Honor Code. You are expected to attend all class sections, actively participate in class discussions, complete in-class exercises and fulfill all assignments. Assignments must be turned in at the beginning of class on the specified date due or **no credit will be given.**

Class Schedule

Week	Topic	Reading/Assignment Due
1	Introduction, Energy	Chapter 5
2	ATP, Phosphagen System, Carbohydrate Metabolism, Wingate/Lactate Lab	Quiz Chapters 6 & 7
3	Carbohydrate Metabolism	<i>Wingate/Lactate Lab due</i> Quiz Chapters 6 & 7
4	Fat and Protein Metabolism	Chapters 6 & 7
5	Review, Exam 1	
6	The Cardiovascular System, Functional Capacity of the Cardiovascular System, Cardiovascular Lab	Quiz Chapter 15& 17
7	Functional Capacity of the Cardiovascular System, Cardiovascular Regulation and Integration, ECG Lab	Chapter 16 <i>Cardiovascular Lab due</i>
8	Pulmonary, Pulmonary Lab	<i>ECG Lab due</i> Chapters 12, 13 & 14
9	Review, Exam 2	<i>Pulmonary Lab due</i>
10	Skeletal Muscle and Nerve Structure, Muscle Contraction	Chapters 18 & 19
11	Muscle Contraction, Muscle Fiber Types	Quiz Chapter 19
12	Muscle Adaptations, Soreness and Fatigue	Chapters 22 & 25
13	Soreness and Fatigue, Muscle Fatigue Lab	Chapter 25
14	Recovery from Exercise, Recovery from Exercise Lab	Chapter 7 <i>Muscle Fatigue lab due</i>
15	Review	<i>Recovery from Exercise Lab due</i>
Monday, 12/12, 10:30am- 1:15pm	Exam 3	

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these

principles: <http://cehd.gmu.edu/values/>.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the University Honor Code (see <http://oai.gmu.edu/the-mason-honor-code/>).
- Students must follow the university policy for Responsible Use of Computing (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <http://ods.gmu.edu/>).
- Students must follow the university policy stating that all sound emitting devices shall be silenced during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursessupport.gmu.edu/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/>.