George Mason University
College of Education and Human Development
Kinesiology

KINE 410.001 - Exercise Physiology II
3 Credits, Fall 2021
Monday, 12:00-1:15pm, Colgan Hall 302- 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	Lecture

	condition: dyspnea, hypoxia, and hyperventilation.	
	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) (40%)
  Exams will be T/F, multiple choice and short answer.

  Lab Reports and Assignments (25%)
  Periodic quizzes and assignments will be assigned throughout the course.

  Quizzes (30%)
  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/polices-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	Meeting Date/Format	Topic	Chapter	Assignments
1	8/23	Course Introduction, Golf ball/ping pong ball activity		

	Asynchronous Online	Energy, Phosphagen System	Chapter 5 Chapter 6	Quiz
2	8/30	Wingate Lab/ Lactate Lab		Wingate/Lactate Lab
	Asynchronous Online	Pathways of Carbohydrate Metabolism	Chapters 6 & 7	Pathway Creation Activity
3	9/6- No Class- Labor Day			
	Asynchronous Online	ATP, Lactate Shuttle, Gluconeogenesis and Regulation of Carbohydrate Metabolism	Chapters 6 & 7	Quiz
4	9/13	Pathway of Fat Metabolism	Chapters 6 & 7	
	Asynchronous Online	Interaction between CHO and Fat Metabolism Training Effects	Chapters 6 & 7	Quiz
5	9/20	**Exam 1**		
	Asynchronous Online	The Cardiovascular System	Chapter 15	Quiz
6	9/27	HR and BP Response to Exercise Lab		HR and BP Response to Exercise Lab
	Asynchronous Online	Functional Capacity of the Cardiovascular System	Chapter 17	Quiz
7	10/4	CV Concept Map Activity		CV Concept Map Activity
	Asynchronous Online	Cardiovascular Regulation and Integration Training Effects	Chapter 16	Quiz
8	*10/11 Fall Break- Meet on 10/12*	ECG Lab		ECG lab
	Asynchronous Online	Gas Exchange and Transport Dynamics of Pulmonary Ventilation	Chapter 13 Chapter 14	Quiz
9	10/18	**Exam 2**		
	Asynchronous Online	Skeletal Muscle: Structure and Function	Chapter 18	Quiz
10	10/25	Steps of Muscle Contraction		
	Asynchronous Online	Nervous system contribution to muscle performance Muscle fiber types	Chapters 18 & 19	Quiz
11	11/1	Muscular Adaptations to	Chapter 22	Posterboard

		Training		Creation
	Asynchronous Online	Soreness and Fatigue	Chapter 22	Quiz
12	11/8- No class- Robison out of town	The Endocrine System- Organization	Chapter 20	Quiz
	Asynchronous Online	The Endocrine System- Acute and Chronic Responses to Physical Activity	Chapter 20	
13	11/15	Hormone activity		Infographic Creation
	Asynchronous Online	Student choice		
14	11/22	**Exam 3**		
	Asynchronous Online	Student choice		
15	11/29	Student choice		
	Asynchronous Online	Student choice		
16	12/6	Student choice		
	12/13 Final Exam 10:30am-1:15pm			

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 Mason Honor Code (see https://catalog.gmu.edu/policies/honor-code-system/).

- Students must follow the university policy for Responsible Use of Computing (see https://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 https://ds.gmu.edu/).

- Students must silence all sound emitting devices 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 https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/.

- For information on student support resources on campus, see https://ctfe.gmu.edu/teaching/student-support-resources-on-campus

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking:

As a faculty member, I am designated as a "Responsible Employee," and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

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