

**George Mason University**  
**College of Education and Human Development**  
**Exercise, Fitness and Health Promotion**

KINE 410.DL1 – Exercise Physiology II  
3 Credits, Spring 2019

**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**

Not Applicable

**Course Delivery Method**

This course will be delivered online (76% or more) using an asynchronous format via the Blackboard learning management system (LMS) housed in the MyMason portal. You will log in to the Blackboard course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on Monday, January 21<sup>st</sup>.

**Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.**

*Technical Requirements*

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:

[https://help.blackboard.com/Learn/Student/Getting\\_Started/Browser\\_Support#supported-browsers](https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers)

To get a list of supported operation systems on different devices see:

[https://help.blackboard.com/Learn/Student/Getting\\_Started/Browser\\_Support#tested-devices-and-operating-systems](https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems)

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a headset microphone for use with the Blackboard Collaborate web conferencing tool.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
  - Adobe Acrobat Reader: <https://get.adobe.com/reader/>
  - Windows Media Player:  
<https://support.microsoft.com/en-us/help/14209/get-windows-media-player>
  - Apple Quick Time Player: [www.apple.com/quicktime/download/](http://www.apple.com/quicktime/download/)

### *Expectations*

- Course Week:  
Because asynchronous courses do not have a “fixed” meeting day, our week will start on Wednesday, and finish on Tuesday.
- Log-in Frequency:  
Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 3 times per week.
- Participation:  
Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- Technical Competence:  
Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues:  
Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.
- Workload:  
Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the student’s

responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.

- Instructor Support:

Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.

- Netiquette:

The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words.* Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.

- Accommodations:

Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

### 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
	<b>GENERAL POPULATION/CORE: EXERCISE PHYSIOLOGY AND RELATED EXERCISE SCIENCE</b>	
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
	<b>GENERAL POPULATION/CORE EXERCISE PRESCRIPTION AND PROGRAMMING</b>	
1.7.16	Knowledge of special precautions and modifications of exercise programming for participation at altitude, different ambient temperatures, humidity, and environmental pollution.	Lecture
	<b>GENERAL POPULATION/CORE: NUTRITION AND WEIGHT MANAGEMENT</b>	
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
	<b>GENERAL POPULATION/CORE: SAFETY, INJURY PREVENTION, AND EMERGENCY</b>	

	<b>PROCEDURES</b>	
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*, 8<sup>th</sup> 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 essay and short answer. Each exam will cover approximately one third of the semester's material.*

Quizzes (35%)

*Quizzes will be delivered weekly and will be T/F and multiple choice format*

Assignments (10%).

*Periodic assignments will be assigned throughout the modules*

- **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:*

**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. Assignments must be turned in on time or **no credit will be given.**

### Class Schedule

Week	Topic	Reading
1	Introduction, Energy	Chapter 5 Chapter 6
2	Phosphagen System, Carbohydrate Metabolism	Chapter 6
3	ATP, Lactate Shuttle, Gluconeogenesis and Regulation of Carbohydrate Metabolism	Chapter 6
4	Fat and Protein Metabolism, How Exercise Training Impacts the Anaerobic and Aerobic Systems	Chapters 6 & 21
5	<b>Exam 1</b>	
6	The Cardiovascular System	Chapter 15
7	Functional Capacity of the Cardiovascular System	Chapter 17
8	Cardiovascular Regulation and Integration, Cardiovascular Adaptations	Chapters 16 & 21
9	Gas Exchange and Transport Dynamics of Pulmonary Ventilation	Chapter 13 Chapter 14
10	<b>Exam 2</b>	
11	Skeletal Muscle: Structure and Function	Chapter 18
12	Neural Control of Human Movement	Chapter 19
13	Muscular Strength: Training Muscles to Become Stronger Part 2: Structural and Functional Adaptations to Resistance Training	Chapter 22
14	Exercise and Thermal Stress	Chapter 25
15	<b>Exam 3</b>	

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 <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](mailto:tk20help@gmu.edu) or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursesupport.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/students/>.

