

George Mason University
College of Education and Human Development
Kinesiology

KINE 410.002 - Exercise Physiology II
3 Credits, Fall 2023
Wednesday, 1:30-3:20pm, Colgan Hall 203- 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:

a. DOMAIN I: HEALTH AND FITNESS ASSESSMENT
2) Determine and administer physical fitness assessments for apparently healthy clients and those with controlled disease.
a) Knowledge of the physiological basis of the components of health-related physical fitness (cardiorespiratory fitness, muscular strength, muscular endurance, flexibility, body composition).
a. DOMAIN I: HEALTH AND FITNESS ASSESSMENT
3) Conduct and interpret cardiorespiratory fitness assessments.
h) Knowledge of the anatomy and physiology of the cardiovascular and pulmonary systems.
l) Knowledge of oxygen consumption dynamics during exercise (e.g., heart rate, stroke volume, cardiac output, ventilation, ventilatory threshold).
a. DOMAIN I: HEALTH AND FITNESS ASSESSMENT
4) Conduct and interpret assessments of muscular strength, muscular endurance, and flexibility.
d) Knowledge of the anatomy of bone, skeletal muscle, and connective tissues.
a. DOMAIN II: EXERCISE PRESCRIPTION AND IMPLEMENTATION
1) Determine safe and effective exercise programs to achieve desired outcomes and goals, and translate assessment results into appropriate exercise prescriptions.
a) Knowledge of strength-, aerobic-, and flexibility-based exercise.
e) Knowledge of the physiologic changes associated with an acute bout of exercise.
f) Knowledge of the physiologic adaptations following chronic exercise training.
b. DOMAIN II: EXERCISE PRESCRIPTION AND IMPLEMENTATION
2) Implement cardiorespiratory exercise prescriptions for apparently healthy clients and those with controlled disease based on current health status, fitness goals and availability of time
k) Knowledge of the anatomy and physiology of the cardiovascular and pulmonary systems including the basic properties of cardiac muscle.
l) Knowledge of the basic principles of gas exchange.
b. DOMAIN II: EXERCISE PRESCRIPTION AND IMPLEMENTATION
3) Implement exercise prescriptions for flexibility, muscular strength, muscular endurance, balance, agility, and reaction time for apparently healthy clients and those with controlled disease based on current health status, fitness goals and availability of time.
j) Knowledge of acute and delayed onset muscle soreness (DOMS).

k) Knowledge of the anatomy and physiology of skeletal muscle fiber, the characteristics of fast-and slow-twitch muscle fibers, and the sliding filament theory of muscle contraction.

Recommended Text

Kenny, L.W., Wilmore, J.H., and Costill, D.L. (2022). *Physiology of Sport and Exercise*, 8th edition. Human Kinetics.

Course Performance Evaluation

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

- **Assignments and/or Examinations**

Lab Reports and Worksheets (45%)

Written reports addressing the data collected during lab activities will be assigned. Worksheets will be delivered in-class based on discussion topics.

Quizzes (45%)

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

- **Other Requirements**

Professionalism (10%)

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	Assignments
1	8/23	Course Introduction, Golf ball/ping pong ball activity	
	Asynchronous Online	Energy, Phosphagen System	Quiz
2	8/30	Phosphagen system journal article discussion	In class worksheet
	Asynchronous Online	Pathways of Carbohydrate Metabolism	Quiz
3	9/6	Wingate Lab/ Lactate Lab	Lab report
	Asynchronous Online	Pathway of Fat Metabolism, Interaction between CHO and Fat Metabolism Training Effects	Quiz
4	9/13	Aerobic Metabolism Lab	
	Asynchronous Online	Oxygen Deficit, Debt, and Recovery	Quiz
5	9/20	Oxygen Deficit and Debt Lab	Lab report
	Asynchronous Online	Functional Capacity of the Cardiovascular System	Quiz

		Cardiovascular Regulation and Integration Training Effects	
6	9/27	HR and BP Response to Exercise Lab	Lab report
	Asynchronous Online	Electrocardiogram Basics	Quiz
7	10/4	Resting ECG Lab	Lab report
	Asynchronous Online	ECG Response and Utility during Exercise	Quiz
8	10/11	Exercising ECG lab	Lab report
	Asynchronous Online	Blood Composition and Oxygen-Carrying Capacity	Quiz
9	10/18	Hematocrit and Hemoglobin lab	Lab report
	Asynchronous Online	Gas Exchange and Transport Dynamics of Pulmonary Ventilation	Quiz
10	10/25	Pulmonary Lab	Lab report
	Asynchronous Online	Skeletal Muscle Physiology	Quiz
11	11/1	Muscle Oxygenation	Lab report
	Asynchronous Online	Soreness and Fatigue	Quiz
12	11/8	Muscle Fatigue	Lab report
	Asynchronous Online	The Endocrine System- Acute and Chronic Responses to Physical Activity	Quiz
13	11/15	Endocrinology journal article discussion	In class worksheet
	Asynchronous Online	The Endocrine System- Acute and Chronic Responses to Physical Activity	Quiz
14	<i>11/22- No Class, Thanksgiving Break</i>		
15	11/29	Endocrinology journal article discussion	In class worksheet

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 VIA should be directed to viahelp@gmu.edu or <https://cehd.gmu.edu/aero/assessments>. 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, sexual harassment, interpersonal violence, and stalking:

As a faculty member, I am designated as a “Non-Confidential Employee,” and must report all disclosures of sexual assault, sexual harassment, 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 or support measures 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/> .