

George Mason University
College of Education and Human Development
School of Kinesiology

KINE 310.003 - Exercise Physiology I
3.0 Credits, Spring, 2020
M, W - 12:00pm - 1:15pm
Katherine G. Johnson Hall, Room 247 - SciTech Campus

Faculty

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PREREQUISITES

Undergraduate level BIOL 124 minimum grade of C and undergraduate level BIOL 125 minimum grade of C. Co-requisite of KINE 200.

UNIVERSITY CATALOG COURSE DESCRIPTION

Introduces students to the physiologic, neuroendocrine, and biochemical changes of the human body that are associated with exercise and work.

COURSE OVERVIEW

This course provides a theoretical basis for understanding the body's physiological responses to exercise. Specifically, the course investigates how the support systems of the body (respiratory, cardiovascular, muscular, etc.) function, in cooperation with human energy production to ensure that energy is provided for exercise. Emphasis will be placed upon the practical application of exercise physiology principles to coaching, teaching, and other physical training practices.

COURSE DELIVERY

The course is a mix of a lecture and discussion course. However, other approaches may be used to facilitate learning. These include: videos, demonstrations and in-class activities. Overall this will be a highly interactive class and students will be encouraged to participate.

LEARNING OBJECTIVES

At the completion of the course, students should be able to:

1. Have a theoretical knowledge regarding the physiological responses and capacity for exercise by the human body.
2. Be able to differentiate the physiological metabolic processes that govern human movement and apply each of these processes to physical performance.
3. Be able to compare and contrast the physiological principles of the support systems of the body and appraise how each system is affected by and adapts to exercise.
4. Demonstrate the ability to make recommendations regarding exercise programs based on basic exercise physiology knowledge.
5. Attain knowledge of current issues in exercise physiology research and be able to critically evaluate published literature.

PROFESSIONAL/ACCREDITATION STANDARDS

This course meets the Commission on Accreditation of Allied Health Education Programs (CAAHEP) requirements and covers the following American College of Sports Medicine's Knowledge-Skills-Abilities.

KSA	Description	Lecture, Lab or Both
	GENERAL POPULATION/CORE: EXERCISE PHYSIOLOGY AND RELATED EXERCISE	
1.1.9	Ability to describe the systems for the production of energy.	Lecture
1.1.13	Knowledge of the heart rate, stroke volume, cardiac output, blood pressure, and oxygen consumption responses to exercise.	Lecture
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
1.1.19	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
1.1.31	Knowledge of how the principles of specificity and progressive overload relate to the components of exercise programming.	Lecture
	GENERAL POPULATION/CORE: PATIENT MANAGEMENT AND MEDICATIONS	
1.5.2	Knowledge of the effects of the following substances on the exercise response such as antihistamines, tranquilizers, alcohol, diet pills, cold tablets, caffeine, and nicotine.	
	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
1.8.4	Knowledge of the effects of diet, exercise and behavior modification as methods for modifying body composition.	Lecture
1.8.7	Knowledge of the importance of maintaining normal hydration before, during, and after exercise.	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	
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/READINGS

Kenney, W.L., Wilmore, J.H., Costill, D.L. (2015) *Physiology of Sport and Exercise* (6th or 7th edition). Human Kinetics. ISBN-13: 9781450477673.

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).

Evaluation Type	Points	Total
Assignments (4)	30	120
Book Quizzes (4)	30	120
Exams (4)	100	400
Group Presentation	100	100
		740

Description of Evaluation

Book Quizzes: Throughout the semester, online quizzes will be posted on Blackboard directly pertaining to the chapter being covered. These quizzes will be assigned and due prior to topic being covered in class. The goal for these quizzes is for you to come to class prepared with some of the basic information so lecture will be focused on application.

Assignments: Four assignments will be given throughout the semester which will pertain to subject matter being covered. Details will be provided and posted on Blackboard.

Exams: Will be multiple choice, true/false, short answer, and essay. They will be given throughout the semester covering information from the lecture and book.

Group Presentation: A 15-20-minute group presentation reviewing the demands of an Olympic Sport of your choosing. <https://www.olympic.org/sports>

Content should include:

- The contribution of and importance of the energy systems
- The amount of training time needed for change and what physiological changes are occurring during this time. Including all the key systems: musculoskeletal, cardiovascular and neurological.
- Typical physiological data needing to be collected for these athletes when assessing their fitness and performance level. What does that information tell us about the systems listed above?
- A rubric will be provided on Blackboard.

Grading Scale

A	4.0	=	97.0 & above				
A	4.0	=	93.0 -- 96.9%	C+	2.3	=	77.0 – 79.9%
A-	3.7	=	90.0 – 92.9%	C	2.0	=	73.0 – 76.9%
B+	3.3	=	87.0 – 89.9%	C-	1.7	=	70.0 – 72.9%
B	3.0	=	83.0 – 86.9%	D	1.0	=	60.0 – 69.9%
B-	2.7	=	80.0 – 82.9%	F	0.0	=	0.0 – 59.9%

Make-up Policy

- For every day an assignment is late 10% will be reduced from the grade received. (Ex: 30 point assignment = 3 points deducted)
- Exams missed due to unexcused absences will not be allowed a make-up exam.
- Make-up exams and assignments will only be offered for those who possess a University sanctioned excuse or doctor's note.

Professional Dispositions

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

Class Schedule

Date		Topic & potential in class assignments	
Jan	20	MLK Holiday – No Class	
Jan	22	Syllabus & Intro	
Jan	27	Energy Systems	Ch. 2
Jan	29	Energy Systems & Exercise	Assignment 1: E.S.
Feb	3	Energy Systems and Exercise	Book Quiz Ch. 5
Feb	5	Energy Expenditure & Fatigue	Ch. 5
Feb	10	Energy Expenditure & Fatigue	
Feb	12	Exam 1	
Feb	17	Nervous System and Exercise	Book Quiz Ch. 3
Feb	19	Nervous System and Exercise	Assignment 2: N.S.
Feb	24	Skeletal Muscle	Book Quiz Ch. 1
Feb	26	Skeletal Muscle / Adaptations to Resistance Training	
Mar	2	Adaptations to Resistance Training	Ch. 10
Mar	4	Exam 2	
Mar	9	<i>Spring Break</i>	
Mar	11	<i>Spring Break</i>	
Mar	16	Cardiovascular System & Exercise	Book Quiz Ch. 6
Mar	18	Cardiovascular Control During Exercise	
Mar	23	Respiratory System & Exercise	Book Quiz Ch. 7
Mar	25	Respiratory System & Exercise	
Mar	30	Cardiorespiratory responses to acute exercise	Ch. 8

Apr	1	Cardiorespiratory Responses to acute exercise	Assignment 3
Apr	6	Exam Review	
Apr	8	Exam 3	Ch. 11
Apr	13	Adaptations to Aerobic & Anaerobic Training	Assignment 4
Apr	15	Adaptations to Aerobic & Anaerobic Training	Ch. 12
Apr	20	The Environment and Exercise: Heat & Cold	
Apr	22	The Environment and Exercise: Heat & Cold	
Apr	27	Group Presentations	
Apr	29	Group Presentations	
May	4	Exam Review	
May	11	Final Exam 4 – 10:30am – 1:15pm	

Exam 4 will be held during our scheduled final exam time – Monday - May 11th 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/> .