

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

KINE 310 (002) — Exercise Physiology I  
3 Credits, Spring 2019  
T, R 1:30 – 2:45 PM, Bull Run Hall 248 – SciTech Campus

**Faculty**

Name: Dr. Jason White  
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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 insure 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's):

KSA	Description	Lecture, Lab or Both
	<b>GENERAL POPULATION/CORE: EXERCISE PHYSIOLOGY AND RELATED EXERCISE</b>	
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
	<b>GENERAL POPULATION/CORE: PATIENT MANAGEMENT AND MEDICATIONS</b>	
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.	
	<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
1.8.4	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
	<b>GENERAL POPULATION/CORE: SAFETY, INJURY PREVENTION, AND EMERGENCY</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/READINGS

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

## SUPPLEMENTARY MATERIAL

Supplementary materials will be used in class and posted on Blackboard.

## 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 Examinations:

Midterm Examination One – 20%

Midterm Examination Two – 20%

Comprehensive Final Examination – 25%

Quizzes (unannounced, usually weekly) – 20%

Assignments & After Class Questions – 15%

**After Class Questions (5%)** – after each class session, before dismissal, you will be required to anonymously write down what you may be having problems with comprehending in class. If you comprehend all class information at the time, you can report that. We will start the next class trying to clear up any confusion. You must be present in class to participate and receive credit.

**Group Lecture (10%)** – Students will work in groups (4) to create a lecture, presentation, quiz and grading on a topic agreed upon by the students and the instructor. The lecture can be up to 15 minutes (with Q&A) of delving deep into a topic. It should be concise and include visual aids. The quiz must have a minimum of 10 clearly understandable yet challenging questions. Lecture topics and dates will be determined day one of classes. Grading will be based on background physiology, etiology, impact of exercise/activity on underlying physiology, current and future research ideas, clarity of presentation, and quality of quiz created.

### Grading Scale

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	

## PROFESSIONAL DISPOSITIONS

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

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. Make-up tests, quizzes, assignments, or other grades will be granted for excused absences only. Excused absences include: serious illness, official university excused absences and extenuating circumstances. It is the student's responsibility to contact the instructor in order to obtain the make-up work. Assignments must be turned in at the beginning of class on the specified date due or **no credit will be given**.

## TENTATIVE COURSE SCHEDULE

Date			Topic & potential in class assignments	
#1	Jan	22		Intro/Control of Internal Environment
#2				Control of Internal Environment
#3				Bioenergetics
#4				Energy Systems and Exercise
#5	Feb	5		Energy Systems and Exercise
#6				Metabolic Response and Adaptations to Ex.
#7				Metabolic Adaptations to Exercise
#8				Nervous System and Exercise
#9				Nervous System and Exercise
#10	Feb	21		<b><u>Exam 1</u></b>
#11				Muscle Physiology and Adaptations to Ex.
#12				Muscle Physiology and Response to Ex.
#13	Mar	5		Neuromuscular (Skeletal Muscle)
#14				Cardiovascular System and Exercise
				<b>Spring Break March 11-17</b>
#15	Mar	19		Cardiac Control During Ex
#16				Cardiac Responses to Ex
#17				Blood Redistribution and Exercise
#18				Cardiovascular Adaptations to Exercise
#19	Apr	2		Respiratory

#20				Respiratory Responses and Adaptations to Ex.	
#21	Apr	9		<b><u>Exam 2</u></b>	
#22				Training Effects and Improving Performance	
#23				Limitations to Performance	
#24				The Environment and Ex.	
#25				The Environment and Ex.	
#26				Nutrition and Ergogenic Aids	
#27				Nutrition and Ergogenic Aids	
#28	May	2		Presentations	
#29				Presentations	
#30				Presentations and Review	

FINAL EXAM – See online for final exam schedule and policy:

*Note: The instructor reserves the right to make changes to the course syllabus and/or schedule at any time. Students will always be informed of any changes made*

### 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/> .**

### **Academic Integrity**

GMU is an Honor Code University; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? First, it means that when you are responsible for a task, you will be the one to perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives and traditions. When in doubt, please ask for guidance and clarification.

