

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

KINE 310-A01: Exercise Physiology I (3)  
Summer 2017

**Faculty**

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**Prerequisites/Corequisites**

BIOL 124, BIOL 125, ATEP 300, Coreq. 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 Method**

This course will be delivered online (76% or more) using 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 August 29, 2016.

**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 a standard up-to-date browser, either Internet Explorer or Mozilla Firefox is required (note: Opera and Safari are not compatible with Blackboard).
- 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 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: [Add or delete options, as desire.]
  - Adobe Acrobat Reader: <https://get.adobe.com/reader/>
  - Windows Media Player: <https://windows.microsoft.com/en-us/windows/downloads/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 Monday, and finish on Sunday.
- 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. 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 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

Kenney, W.L., Wilmore, J.H., Costill, D.L. (2015) *Physiology of Sport and Exercise (6th 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).

- **Assignments and Examinations**

#### Exams and Final Exam (*Objectives 1, 2, 3 & 4*)

There will be **4** mid-term exams and a final exam (**5** total exams). The final exam will be cumulative. The format for all exams will be multiple choice, true/false, and fill in the blank questions. **IMPORTANT** – the exams will be timed. Once you start the exam you must complete within a set amount of time (90 minutes for mid-term exams; 120 minutes for the final exam).

#### Homework Assignments (*Objectives 1, 4 & 5*)

Regular homework will be assigned. There will be **8** total HW assignments. No late homework assignments will be accepted. All homework assignments must be submitted on Blackboard.

#### Research Paper OR Research Presentation (*Objective 5*)

Students will be required to submit a research paper OR powerpoint research presentation which includes audio. ***Students are allowed to select whether they submit a paper or powerpoint presentation – the same grading rubric will be used for each.*** The assignment will be a literature review of a specific topic in the field of exercise physiology. The literature review must summarize the **major** papers related to the topic chosen. For the research paper the review must be 4-6 pages (typed, double-spaced, 12 pt font). For the powerpoint research presentation the length of the presentation must be 10 to 15 minutes. Audio of you presenting must be included throughout the presentation. For both a **minimum of 10** references must be used. The paper and presentation should be formatted using AMA guidelines. A more detailed description of the requirements will be made available on Blackboard. The research paper or presentation must be submitted on Blackboard.

- **Other Requirements**
  - **Correspondance**
    - The preferred method of communication is email. Emails should originate from a George Mason email account and be in a professional format (i.e. emails should not look like a text message!). Emails with no text in the body will not be acknowledged.
- **Grading**
  - This course will be graded on a point system, with a total of 1000 possible points.

<b>Assignment</b>	<b>Percentage / Points</b>
Exam 1	15% / 100
Exam 2	15% / 100
Exam 3	15% / 100
Exam 4	15% / 100
Homework Assignments	20% / 200
Research Paper OR Research Presentation	15% / 150
Professionalism	5% / 50

### **Grading Scale**

A = 94 – 100	B+ = 88 – 89	C+ = 78 – 79	D = 60 – 69
A- = 90 – 93	B = 84 – 87	C = 74 – 77	F = 0 – 59
	B- = 80 – 83	C- = 70 – 73	

Note: \* Although a B- is a satisfactory grade for a course, students must maintain a 3.00 average in their degree program and present a 3.00 GPA on the courses listed on the graduation application.

### **Professional Dispositions**

Students are expected to exhibit professional behaviors and dispositions at all times.

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.

## Class Schedule

DATE			TOPIC	READINGS/ASSIGNMENT DUE
Week 1	May	22	<b>Read:</b> Syllabus <b>Study PowerPoint slides:</b> Introduction to Exercise Physiology, Macronutrients and Micronutrients	Read Chapter 15 pp 380-406
Week 1	May	23	Study for Quiz; Start HW #1; Continue reviewing materials (Readings, PPT, & supplemental materials) for Exam #1	Complete <b>Practice Quiz 1</b> by Midnight Tuesday, May 23
Week 1	May	24	<b>Read/Listen/Watch:</b> Supplemental Materials on Blackboard for Exam #1; Read Book; Work on HW #1	
Week 1	May	25	<b>Study PowerPoint slides:</b> Optimum Nutrition for Exercise; Ergogenic Aids to Performance	1) Read Chapter 16 2) <b>HW #1</b> Due by Midnight on Thursday, May 25
Week 1	May	26	Review for Exam #1, Work on HW #2	
Week 1	May	27-28	<b>Exam #1</b>	1) <b>Exam 1</b> completed by Midnight on Sunday, May 28 2) <b>HW #2</b> Due by Midnight on Sunday, May 28
Week 2	May	29	<b>Study PowerPoint slides:</b> Fundamentals of Human Energy Transfer During Exercise;	Read Chapter 2
Week 2	May	30	<b>Read/Listen/Watch:</b> Supplemental Materials on Blackboard for Exam #2; Read Book; Work on HW #3	Complete <b>Practice Quiz 2</b> by Midnight Tuesday, May 30

Week 2	May	31	<b>Study PowerPoint slides:</b> Measuring and Evaluating Human Energy – Generating Capacities During Exercise; Energy Expenditure During Rest and Physical Activity	1) Read Chapter 5 2) <b>HW #3</b> Due by Midnight on Wednesday, May 31
Week 2	June	1	Review for Exam #2, Work on HW #4	
Week 2	June	2-4	<b>Exam #2</b>	<b>1) HW #4</b> Due by Midnight on Sunday, June 4 <b>2) Exam 2</b> completed by Midnight on Sunday, June 4
Week 3	June	5	Work on HW #5	
Week 3	June	6	<b>Study PowerPoint slides:</b> The Cardiovascular System and Exercise	1) Read Chapter 6 2) Read Chapter 8 pp 195-210
Week 3	June	7	<b>Read/Listen/Watch:</b> Supplemental Materials on Blackboard for Exam #3; Read Book; Work on HW #6	<b>HW #5</b> Due by Midnight on Wednesday, June 7
Week 3	June	8	<b>Study PowerPoint slides:</b> The Respiratory System and Exercise	1) Read Chapter 7 2) Read Chapter 8 pp 211-219 <b>3) HW #6</b> Due by Midnight on Thursday, June 8
Week 3	June	9	<b>Read/Listen/Watch:</b> Supplemental Materials on Blackboard for Exam #3; Read Book; Work on HW #7	
Week 3	June	10-11	<b>Study PowerPoint slides:</b> The Neuromuscular System Research paper/PowerPoint project topic selection	1) Read Chapter 3 <b>2) Research paper/PowerPoint topics Selections</b> due by Midnight on Sunday, June 11
Week 4	June	12	<b>Read/Listen/Watch:</b> Supplemental Materials on Blackboard for Exam #3; Read Book	
Week 4	June	13	<b>Study PowerPoint slides:</b> The Endocrine System - Hormones, Exercise and Training	1) Read Chapter 4 2) Complete <b>Practice Quiz 3</b> by Midnight on Tuesday, June 13

<b>Week 4</b>	June	14	Review for Exam #3	
<b>Week 4</b>	June	15	<b>Exam #3</b>	<b>Exam #3</b> completed by Midnight on Thursday, June 15
<b>Week 4</b>	June	16	<i>Study PowerPoint slides:</i> Exercise Training and Adaptations	Read Chapters 9, 10, & 11
<b>Week 4</b>	June	17	<i>Read/Listen/Watch:</i> Supplemental Materials on Blackboard for Exam #4; Read Book; Work on HW #8	Read Chapters 12, 13, & 14
<b>Week 4</b>	June	18	<i>Study PowerPoint slides:</i> Body Composition, Obesity, Aging and Disease Prevention	1) Read Chapters 15 pp 369 – 380, 17, 18, 19, & 22 2) <b>HW #7</b> Due by Midnight on Sunday, June 18
<b>Week 5</b>	June	19	<i>Study PowerPoint slides:</i> Body Composition, Obesity, Aging and Disease Prevention	1) Read Chapters 19, 20, & 21 2) Complete <b>Practice Quiz 4</b> by Monday, June 19
<b>Week 5</b>	June	20	Work on Research Paper OR PowerPoint Presentation	<b>HW #8</b> Due by Midnight on Tuesday, June 20
<b>Week 5</b>	June	21	Work on Research Paper OR PowerPoint Presentation	
<b>Week 5</b>	June	22	Work on Research Paper OR PowerPoint Presentation	<b>Research/ PowerPoint Project</b> due by Midnight on Thursday, June 22
<b>Week 5</b>	June	23	Study for Exam #4	
<b>Week 5</b>	June	24	<b>Exam #4</b>	<b>Exam #4</b> completed by Midnight on Saturday, June 24

**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/>.
- The Writing Center provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (see <http://writingcenter.gmu.edu/>).
- The Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (see <http://caps.gmu.edu/>).

- The Student Support & Advocacy Center staff helps students develop and maintain healthy lifestyles through confidential one-on-one support as well as through interactive programs and resources. Some of the topics they address are healthy relationships, stress management, nutrition, sexual assault, drug and alcohol use, and sexual health (see <http://ssac.gmu.edu/>). Students in need of these services may contact the office by phone at 703-993-3686. Concerned students, faculty and staff may also make a referral to express concern for the safety or well-being of a Mason student or the community by going to <http://ssac.gmu.edu/make-a-referral/>.

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