George Mason University
College of Education and Human Development
Kinesiology

KINE310.A01: Exercise Physiology I
3 Credits, Summer 2018
Online

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 May XX, 2018.

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/

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
	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
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**

Chapter Quizzes and Final Exam *(Objectives 1, 2, 3 & 4)*
There will be **16** Quizzes and a final exam. The final exam will be cumulative. The format for all will be multiple choice, true/false, and fill in the blank questions. The lowest quiz score will be dropped and your 'quiz grade' will be the average of the remaining 15 quiz scores. **IMPORTANT** – the quizzes and final exam will be timed. Once you start you must complete within a set amount of time (30 minutes for Chapter Quizzes; 120 minutes for the final exam).

Homework Assignments *(Objectives 1, 4 & 5)*
Regular homework will be assigned throughout the semester. Assignments will either require you to read a research article and answer questions based on the article or post to a discussion board thread. There will be **8** total HW assignments. No late homework assignments will be accepted. All homework assignments must be submitted on Blackboard.

Professionalism *(Course objectives 1, 2, 3, 4, & 5)*
Students are expected to behave in a professional manner. Depending on the setting professionalism may look slightly different but generally consists of similar components. For undergraduate Kinesiology students in a classroom setting professionalism generally consists of the following components:

Communication – When communicating with the instructor and classmates, either face-to-face or via email, students should address the other person appropriately, use appropriate language and maintain a pleasant demeanor.

Example email with instructor:
Dr. Martin,

I have a question regarding….

Regards,
Student's Name

Example in-person interaction with instructor:
Student: Professor (*instructor's last name*) I have a question regarding….
Professor: (Student's name) I would be happy to help you. What is your question?
Student: My question is…….
Professor: The answer to that question is…
Student: Professor (*instructor's last name)* thank you for your time and availability to answer my questions.

Responsibility/Accountability/ Honesty/Integrity– 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. 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. See George Mason University policy for further guidance.

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. Specific to this class an example of how a student may demonstrate self-improvement/self-awareness is by attending office hours following a poor grade on an exam or assignment.

Professionalism evaluation – *Any professionalism violation will be documented by the instructor. Violations will result in a 1-point deduction from the final average. In extreme cases the student may be dismissed from the class at the discretion of the instructor.*

- **Other Requirements**
  - **Correspondence**
    - 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.

Assignment	**Quantity**	**Percentage / Points**
Chapter Quizzes	15	10% / 600
Final Exam	1	20% / 150
Homework Assignments	8	20% / 200
Professionalism	N/A	5% / 50

	Total	100% / 1000

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	

Notes:
1) 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.
2) Any student asking for their grade to be rounded up, increased a letter grade, extra credit only for themselves at the end of the semester, etc. may have their final average reduced by up to 2 points at the discretion of the instructor.

Professional Dispositions
See https://cehd.gmu.edu/students/polices-procedures/

Class Schedule

DATE			SUGGESTED ACTIVITY FOR THE DAY	ASSIGNMENT DUE
Module 1: Introduction to Exercise Physiology and Exercising Muscle				
Week 1	May	21	Watch Introduction to Course Video; Read the syllabus	
Week 1	May	22	Read Chapter 1 & 2	**HW 1**
Week 1	May	23	Lecture 1 Slides – Structure & Function of Muscle	**Chapter 1 Quiz**
Week 1	May	24	Lecture 2 – Bioenergetics & Muscle Metabolism	**Chapter 2 Quiz**
Week 1	May	25	Read Chapter 3 & 4	
Week 1	May	26-27	Lecture 3 – Neural Control of Exercising Muscle; Lecture 4 – Hormonal Control During Exercise	**Chapter 3 & 4 Quiz – Due Midnight on May 27**
Week 2	May	28	Read Chapter 5	
Week 2	May	29	Lecture 5 – Energy Expenditure & Fatigue	**Chapter 5 Quiz; HW 2 Due**
Module 2: Cardiovascular & Respiratory Function				
Week 2	May	30	Read Chapter 6	
Week 2	May	31	Lecture 6 – The Cardiovascular System	**Chapter 6 Quiz**
Week 2	June	1	Read Chapter 7	**HW 3 Due**
Week 2	June	2-3	Lecture 7 – The Respiratory System	**Chapter 7 Quiz Due Midnight on June 3**
Week 3	June	4	Read Chapter 8	**HW 4 Due**
Week 3	June	5	Lecture 8 – Cardiorespiratory Responses To Acute Exercise	**Chapter 8 Quiz**
Module 3: Exercise Training				
Week 3	June	6	Read Chapter 9 & 10;	
Week 3	June	7	Lecture 9 – Principles of Exercise Training; Lecture 10 – Adaptations to Resistance Training	**HW 5 Due**
Week 3	June	8	Read Chapter 11; Lecture 11 – Adaptations to Aerobic & Anaerobic Training	**Chapter 9+10+11 Quiz**
Module 4: Environmental Influences on Performance				
Week 3	June	9-10	Read Chapter 12; Lecture 12 – Exercise in Hot and Cold Environments	**Chapter 12 Quiz due by Midnight on June 10**
Week 4	June	11	Read Chapter 13; Lecture 13 – Exercise at Altitude	**HW 6 Due**
Week 4	June	12	Study	**Chapter 13 Quiz**
Module 5: Optimizing Performance in Sport				

Week 4	June	13	Read Chapter 14 & 15; Lecture 14 – Training for Sport; Lecture 15 – Body Composition & Nutrition for Sport	**HW 7**
Week 4	June	14	Read Chapter 16; Lecture 16 – Ergogenic Aids in Sport	**Chapter 14+15+16 Quiz**
Module 6: Individual Factor Considerations in Sport & Exercise				
Week 4	June	15	Read Chapter 17; Lecture 17 – Children and Adolescents	**HW 8**
Week 4	June	16-17	Read Chapter 18; Lecture 18 – Older Populations	**Chapter 17+18 Quiz Due Midnight on June 17**
Week 5	June	18	Read Chapter 19; Lecture 19 – Sex Differences	**Chapter 19 Quiz**
Module 7: Physical Activity for Health & Fitness				
Week 5	June	19	Read Chapter 20; Lecture 20 – Exercise Prescription for Health & Fitness	**Chapter 20 Quiz**
Week 5	June	20	Read Chapter 21 & 22; Lecture 21 – CVD, Obesity, Diabetes & Physical Activity	**Chapter 21+22 Quiz**
Week 5	June	21	Study For Final	
Week 5	June	22	Study For Final	
Week 5	June	23	Final Exam	**Due by Noon on June 23**

Notes: 1) + sign means that material from chapters is combined into 1 quiz. 2) Faculty reserve 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 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 or https://cehd.gmu.edu/aero/tk20. Questions or concerns regarding use of Blackboard should be directed to http://coursessupport.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/ .