UF Department of Applied Physiology and Kinesiology
College of Health and Human Performance
UNIVERSITY of FLORIDA

Advanced Exercise Physiology

APK4112 | Class # 26645| 3 Credits | Fall 2025

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Course Info

INSTRUCTOR

Terence E. Ryan, Ph.D.
Office: FLG 114
Office Phone: 294-1700
Email: ryant@ufl.edu
Preferred Method of Contact: **email**

OFFICE HOURS

Office hours will be posted on the Canvas page

MEETING TIME/LOCATION

FLG 265 - Tuesday period 4 (10:40A – 11:30A)
FLG 265 - Thursday periods 4-5 (10:40A – 12:35P)

COURSE DESCRIPTION

THIS COURSE IS DESIGNED TO PROVIDE A DETAILED UNDERSTANDING OF ACUTE AND CHRONIC RESPONSES TO EXERCISE. PARTICULAR ATTENTION IS PLACED UPON UNDERSTANDING THE PHYSIOLOGICAL RESPONSES TO EXERCISE AT BOTH A SYSTEMS AND CELLULAR LEVEL. EMPHASIS IS PLACED ON MUSCLE CONTRACTILE PROPERTIES, MUSCLE BIOENERGETICS AND THE ENDOCRINE RESPONSES TO EXERCISE.

PREREQUISITE KNOWLEDGE AND SKILLS

APK3110C with a minimum grade C

REQUIRED AND RECOMMENDED MATERIALS

The instructor will post lecture slides, videos, and reading material as appropriate on Canvas. The student does not need to identify additional resources to complement the material provided or solve problems posed in the course.

Lecture notes and materials posted on the class website are the property of the instructor or the publishers of the material. They are posted solely for students in this course, for educational purposes, and to facilitate note-taking and studying. No part of the materials may be re-distributed, reproduced, or used for any purpose other than note-taking and studying.

Textbook: A custom e-book titled 'University of Florida custom e-book Advanced Exercise Physiology' is required for the course. Students can purchase the e-book using UF All Access. Login at the following website and Opt-In to gain access to your required course materials - https://www.bsd.ufl.edu/AllAccess – UF All Access will provide you with your required materials digitally at a reduced price and the charge will be posted to your student account. This option will be available starting 1 week prior to the start of the semester and ending 3 weeks after the first day of class. The publisher's website is included here for convenience (Human Kinetics: http://www.humankinetics.com/products/all-products/University-of-Florida-Custom- eBook-Advanced-Exercise-Physiology).

There will be reading assignments from the book's chapters and other sources as needed. Topics covered in the reading assignments will be in exams or quizzes even if not covered in lecture or discussions. Questions on reading topics not covered in lecture or discussions will be general and assess the students' ability to define and describe concepts in bioenergetics and exercise physiology. Questions on topics covered in lectures or class discussions will involve in-depth concepts and problem solving.

Suggested book on introductory material for review of basic concepts: Powers, S. and E. Howley. Exercise Physiology: theory and application to fitness and performance. McGraw Hill. 9th edition. ISBN-13: 978-0073523538.

Access to computer and CANVAS.

COURSE FORMAT

The course includes two meetings per week. One day of the week will be dedicated to live lectures, the other day the class will meet for a quiz followed by active learning. Active learning sessions include discussion of questions and presentation of concepts or solving applied problems related to physiology.

COURSE LEARNING GOALS: By the end of this course, students should be able to:

- Define, describe, and illustrate basic and advanced bioenergetics and physiological processes involved in the regulation of metabolism, skeletal muscle contraction and fatigue, blood flow and blood pressure, and breathing.
- Explain the integration of multiple systems in response to exercise and solve problems in that context
- Interpret and propose explanations for the metabolic, muscle, and cardiovascular responses to exercise in health, disease, and environmental challenges
- Defend and critique material or ideas related to bioenergetics, performance, and integrative exercise physiology

University Policies

University policies are summarized here. This link will direct students to a separate webpage that provides all required academic policies such as attendance, grading, personal conduct, DRC and evaluation verbiage, as well as academic, health, and wellness resources available.

Course Policies

ATTENDANCE POLICY

Make every effort to attend all class meetings. Missing classes will likely have an impact on participation grade. The rubric for participation points is included below under 'GRADING'. Students called for participation in lectures or discussion sessions and not present will receive a zero for participation. Students who receive a zero in participation for unexcused absence will not be able to earn full credit for participation. Students who need to miss a class should communicate and discuss with the instructor, in advance of missing a class, to avoid penalties on participation.

EXAM MAKE-UP POLICY

For all planned absences, a student in a situation that allows an excused absence from a class, or any required class activity must inform the instructor as early as possible prior to the class. For all unplanned absences because of accidents or emergency situations, students should contact their instructor as soon as conditions permit.

A student experiencing an illness should visit the UF Student Health Care Center or their preferred healthcare provider to seek medical advice and obtain documentation. If you have an illness, family emergency or death, please provide any documentation to the instructor regarding illness or family emergency.

COURSE EVALUATIONS

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at here . Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via this site . Summaries of course evaluation results are available to students here.

Grading

The following table outlines the point-accruing components of this course.

Evaluation Components (number of each)	% of Total Grade
Exams (3)	40.0%
Quizzes (8)	40.0%
Participation (3)	20.0%
Labster Simulations (Extra Credit)	1.5%

Exams (40% of final grade) – Exams will be at the end of each module (three exams total, one per module). Each exam will contain 15-20 questions and will last 50-120 min. Exams will be based on reading assignments and content covered in discussions and lectures. Questions will be multiple choice and true/false. Exams require the use of a lockdown browser so that no other material can be accessed. Class materials, notes, or other sources cannot be used during the exams. Unauthorized use of materials will be considered a violation of the Academic Honor Code. Students will take exams in the same room where weekly class meetings are held and these exams require the use of Lockdown Browser.

Quizzes (40% of final grade) – There will be quizzes administered in class using Canvas. The quiz addresses a topic that has been presented through video lectures, slides in class, and assigned reading. These quizzes are generally at the beginning of the class, but might also happen in the middle or at the end of class. The quiz will consist of short-questions or simple problem-solving exercises. Students will take the quiz individually and any type of collaboration with other students, opening of non-quiz related website, or checking material from self or

other during the quiz is prohibited. There will be 1-10 questions per quiz. The lowest quiz score for each student will be dropped automatically.

Participation (20% of final grade) – This will be determined based on the student's preparedness assessed by quality and correctness of submission of hand-written answers (submitted online) and drawings to discussion questions, involvement in class activities or lectures, and contribution in classroom discussions. Students are required to participate through presentation of a lecture slide, providing answers on the board, and discussion of applied questions in front of class. Students should participate at least once in each module to receive all points. Students can be called for further participation in each module, after earning full points, at the discretion of the instructor. The instructor will select a student to participate, but students can also volunteer to participate. There are no pre-arrangements of questions or topics for specific students. Students should be prepared to present all slides, answer all questions, and discuss all problems assigned for the day.

Students will receive participation points for presenting their understanding of concepts, complementing comments from other students, or responding to questions from the instructor following the rubric outlined below. If the instructor calls a student who is absent, the student will receive a zero on participation unless the absence is justified according to UF policies as outlined above. If there are hindrances for students to participate in class, the instructor will meet with the student (individually or in small group) to discuss the topic, or rely on the online submission of hand-written answers and drawings to assign participation points.

A rubric for assignment of participation points is below:

Excellent	20 pts	- Defines, describes, and illustrates concepts - Explains, assesses and criticizes ideas - Demonstrates preparation and reading of assignments
Good	18 pts	- Defines, describes, and illustrates concepts - Explains, assesses and criticizes ideas - Evidence of reading assignments, but not fully prepared
Reasonable	16 pts	- Defines, describes, and illustrates concepts - Explains, assesses, or criticize some ideas - Evidence of incomplete reading of assignments and preparation
Basic	14 pts	- Defines and describes some concepts - Explains but cannot assess and criticize ideas - Clearly unprepared and lacking evidence of reading assignments
Bare Minimum	12 pts	- Defines and describes some concepts - Unable to explain, assess, or criticize ideas - Clearly unprepared and lacking evidence of reading assignments
Unacceptable	0 pts	- Refuses to engage in discussion or answer questions when asked - Engaged into inappropriate behaviors (using cell phone, social media, visiting irrelevant websites) - Not present

Online submissions of weekly assignments: The hand-written answers and drawings that the instructor will evaluate to grade participation must provide a comprehensive response, be neatly organized and legible, and include drawings and concise text explaining the concepts and rationale for each answer. Points will be deducted from answers that do not include schematic or diagram drawings.

Extra Credit - Students can earn up to 1.5% final grade points (0.5 per module) of extra credit in the course. Extra credits are based on successful completion of written essay questions provided via canvas for each module.

Grading Scale: Students take exams and quizzes using Canvas and scores are available immediately upon submission. Students should contact the instructor as soon as possible if they feel there is an error in the grading of individual questions or submission of final grades. Final course grades will be assigned based on the table below. The grade achieved by the student and showing on Canvas is final. There is no rounding of grades in any circumstance. Any requests for additional extra credit or special exceptions to these grading policies will be interpreted as an honor code violation (i.e., asking for preferential treatment) and will be handled accordingly.

Letter Grade	Percent of Total Points Associated with each Letter Grade	GPA Impact of Each Letter Grade
A	90.00 – 100%	4.00
B+	87.00 – 89.99%	3.33
B	80.00 – 86.99%	3.00
C+	77.00 – 79.99%	2.33
C	70.00 – 76.99%	2.00
D+	67.00 – 69.99%	1.33
D	60.00 – 66.99%	1.00
E	0.00 – 59.99%	0.00

More detailed information regarding current UF grading policies can be found here. *Any requests for additional extra credit or special exceptions to these grading policies will be interpreted as an honor code violation (i.e., asking for preferential treatment) and will be handled accordingly.*

Weekly Course Schedule

WEEKLY SCHEDULE (updates and/or changes will be announced via CANVAS)

The course includes three modules: I) Energetics, Metabolism, and Endocrine Exercise Physiology; II) Skeletal Muscle Excitation, Contraction, and Fatigue; and III) Cardiovascular and Hemodynamics Regulation. The modules emphasize exercise and physiological responses to environmental challenges in health and disease.

Module 1
Topic 1 – Enzyme Kinetics
Topic 2 – Energy Systems and Bioenergetics
Topic 3 – Glucose Uptake
Topic 4 – Glycogen Metabolism
Topic 5 – Glycolysis
Topic 6 – Pyruvate and Lactate Metabolism
Topic 7 – Lipolysis
Topic 8 – Citric Acid Cycle and Oxidative Phosphorylation

Module 2
Topic 1 – Skeletal Muscle, Macro, Micro, and Molecular Structure
Topic 2 – Sarcomere and SR Structure-Function
Topic 3 – Neuromuscular Junction, Neuromuscular Transmission, and EC Coupling
Topic 4 – Calcium-activated force and cross-bridge cycle
Topic 5 – Passive Muscle Mechanics
Topic 6 – Active Contractile Properties

Module 3

Topic 1 - Cardiovascular Autonomic and Hormonal Control
Topic 2 – Baroreflex and Exercise Blood pressure
Topic 3 – Smooth Muscle: Structure-Function and Extrinsic Control
Topic 4 – Intrinsic Control and Exercise Hyperemia
Topic 5 – Cardiovascular Adaptations to Exercise

Tentative dates and course plan are below. Any changes to schedule will be announced on Canvas.

Date	Class Activity	Module
		Module 1
21-Aug	Course Introduction and Background Lecture	
26-Aug	Lecture - Topics 1 and 2	
28-Aug	**Quiz and Discussion** – Topics 1-2	
02-Sept	Lecture - Topics 3-4	
04-Sept	**Quiz and Discussion** – Topics 3-4	
09-Sept	Lecture - Topics 5-6	
11-Sept	**Discussion** – Topics 5-6	
16-Sept	Lecture - Topics 7-8	
18-Sept	**Quiz and Discussion** – Topics 7-8	
23-Sept	Exam Review and Extra Credit Due	
25-Sept	**EXAM 1**	
30-Sept	Lecture – Topics 1-2	Module 2
02-Oct	**Discussion** - Topics 1-2	
07-Oct	Lecture – Topics 3-4	
09-Oct	**Quiz and Discussion** - Topics 3-4	
14-Oct	Lecture – Topics 5-6	
16-Oct	**Quiz and Discussion** - Topics 5-6	
21-Oct	Exam Review and Extra Credit Due	
23-Oct	**EXAM 2**	
28-Oct	Lecture – Topics 1-2	Module 3
30-Oct	**Quiz and Discussion** – Topic 1-2	
04-Nov	Lecture – Topics 3-4	
06-Nov	**Quiz and Discussion** – Topics 3-4	
11-Nov	HOLIDAY – No class	
13-Nov	Lecture and Discussion – Topic 5	
18-Nov	Exam Review and Extra Credit Due	
20-Nov	**EXAM 3**	

SUCCESS AND STUDY TIPS

The instructor encourages you to learn to UNDERSTAND the material by listening, reviewing the lectures and performing the reading. Take the extra time to understand underlying mechanisms and worry less about memorizing. Terms are important because they are holding places for new concepts but they can always be looked up or googled. Concepts are harder to master and more important for this class. Additional tips for success are below:

- Read the textbook and other reading assignments BEFORE coming to lectures and discussions. Do not take notes, underline, highlight, or attempt to memorize anything. Just READ and enjoy!
- There will be material in the reading assignments that is not covered in lecture which WILL appear on quizzes and exams. There is simply not enough lecture time to cover all materials.
- Do not attempt to memorize all materials. The best grades are usually obtained by focusing efforts on full comprehension of the materials and developing critical thinking skills.

- Examine quiz and exam questions carefully. Some questions involve multiple parts. Taking complex questions and breaking them down to identify exactly what the question is REALLY asking for is very helpful.
- Do not fall behind. This course moves at a FAST pace and covers advanced topics. You can easily get overwhelmed if you procrastinate.
- Stay organized – keep track of important due dates.
- Check CANVAS announcements and emails daily! The instructor will post important and helpful information here.
- Don't be afraid to be incorrect during discussions. The goal of these sessions is to develop full comprehension of the materials (rather than short-term memorization) so that you can discuss your thought process and how you came to your conclusion.