

COURSE TITLE

APK6170 - 3 CREDITS - SPRING 2021

INSTRUCTOR: Leonardo F. Ferreira, PhD, PT
Office: FLG 110
Office Phone: 352-294-1724
Email: ferreira@hhp.ufl.edu
Preferred Method of Contact: email
Preferred pronouns: *he, him, his*

OFFICE HOURS: Wed (01:00pm – 02:00pm)
Fri (10:00am – 11:00am)

MEETING TIME/LOCATION: T | Period 1 (7:25 AM - 8:15 AM)
R | Period 1 - 2 (7:25 AM - 9:20 AM)

Meetings will be held in room 270 FLG and remotely via Zoom – links will be available on Canvas

COURSE DESCRIPTION: This advanced course provides 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: APK 6116 or similar with minimum C grade.

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.

Original research and review articles provided by the instructor.

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 OBJECTIVES: 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

COURSE AND UNIVERSITY 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.

PERSONAL CONDUCT POLICY: Students are expected to exhibit behaviors that reflect highly upon themselves and our University. **Audio or video recordings** of any part of this course or activities in class are **not allowed without written consent by the instructor**. Any material recorded shall be used solely by students in the course. Recorded material from the class cannot be published, shared with others not taking the course, or made publicly available online in any circumstance.

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult the instructor or TA in this class.

EXAM MAKE-UP POLICY: 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 contact the Dean of Students Office (www.dso.ufl.edu) and follow the DSO Care Team procedures for documentation and submission of a request for make-up assignment (<https://care.dso.ufl.edu/instructor-notifications/>). The DSO will contact the instructor. Do not provide any documentation to the instructor regarding illness or family emergency. This is your personal and protected information. The DSO is qualified to receive and verify the documents you provide. The instructor will follow the recommendations from the DSO. Students who have occasional extra-curricular or academic activities that conflict with exams or quizzes should contact the instructor in advance to make arrangements to make-up the assignments. Unexcused absences/availability for exams will result in a zero on the exam. Make-up exams are offered at reasonable times in agreement with the instructor.

In all cases, students must make-up quizzes from each module within one week of the end of the module, unless impeded by extenuating circumstances. “Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.”

ACCOMMODATING STUDENTS WITH DISABILITIES: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting their Get Started page at <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

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 <https://gatorevals.aa.ufl.edu/students/>. 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 <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

COVID-RELATED: For the face to face section of this course, in response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions:

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor’s guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms](#).

- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies.](#)

PRIVACY: Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

STUDENT IDENTIFICATION AND INSTRUCTOR INTERACTIONS

It is important to the learning environment that you feel welcome and safe in this class; and that you are comfortable participating in class discussions and communicating with the instructor on any issues related to the class.

I would like to acknowledge your preferred name, and pronouns that reflect your identity. Please let me know how you would like to be addressed in class if your name and pronouns are not reflected by your name listed on the UF-roster. I welcome you to the class and look forward to a rewarding learning adventure together.

You may also change your "Display Name" in Canvas. Canvas uses the "Display Name" as set in myUFL. The Display Name is what you want people to see in the UF Directory, such as "Ally" instead of "Allison." To update your display name, go to one.ufl.edu, click on the dropdown at the top right, and select "Directory Profile." Click "Edit" on the right of the name panel, uncheck "Use my legal name" under "Display Name," update how you wish your name to be displayed, and click "Submit" at the bottom. This change may take up to 24 hours to appear in Canvas. This does not change your legal name for official UF records.

Please keep your preferred name (first and last, if possible) visible for live sessions.

INCLUSION, DIVERSITY, EQUITY, AND ACCESSIBILITY RESOURCES

This is a science-based course, which should ideally be objective in its presentation, interpretation, and valid for everyone. However, much of science is subjective and is historically built on a small subset of privileged voices. I acknowledge that the readings for this course were authored by white men and women. Furthermore, the course relies heavily on findings from experiments mostly conducted by white men. The interpretation and presentation are modified, as feasible, by the instructor. I will make an effort to acknowledge whenever possible the contribution that people from several races, sexes, and backgrounds have given to the field. However, I admit that it is possible that there may be both overt and covert biases in the material due to the lens

with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science. Please contact me (in person or electronically) or submit anonymous feedback if you have any suggestions to improve the quality of the course materials.

Furthermore, I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.) To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official UF records, let me know as indicated above.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. Remember that you can also submit anonymous feedback (which will lead to me making a general announcement to the class, if necessary to address your concerns).
- If you prefer to speak with someone outside of the course, see the list of contacts below.
- I am continuing to learn about diverse perspectives and identities, and still adapting to the cultural differences between countries and regions. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. Again, anonymous feedback is always an option.

For general suggestions or concerns related to IDEA, please reach out to any of the following:

- Dr. Leo Ferreira, APK IDEA Liaison, ferreira@hhp.ufl.edu
- Dr. Rachael Seidler, APK Graduate Coordinator, rachaelseidler@ufl.edu
- Dr. Joslyn Ahlgren, APK Undergraduate Coordinator, jahlgren@ufl.edu

GETTING HELP:

Health and Wellness

- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575
- Counseling and Wellness Center: <https://counseling.ufl.edu/>, 352-392-1575
- Sexual Assault Recovery Services (SARS) - Student Health Care Center, 392-1161
- University Police Department, 392-1111 (or 9-1-1 for emergencies)
<http://www.police.ufl.edu/>

Academic Resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>
- Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. <https://career.ufl.edu/>
- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>
- Student Complaints On-Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/> On-Line Students Complaints: <http://distance.ufl.edu/student-complaint-process/>

GRADING:

Students in the course will be assessed through quizzes in class, exams, and participation in discussion session. Quizzes are administered weekly. There are three exams in the course (one per module). Discussion sessions for participation are held weekly.

Degree	Assessment				
	Quizzes	Written Exam	Participation	Research Articles	Oral Exam
MS	20	40	20	20	n.a.
PhD	10	30	20	10	30

Quizzes (MS and PhD students) – 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.

Written exams

MS students: Exams will be at the end of a module (three exams, one per module). Each exam will contain 20 to 25 questions and last 50-100 min. Questions will be fill the blank, multiple choice, short essay, and true/false.

PhD students: Exams will follow 'qualification exam' style, with 4-5 questions and last 100 min. All questions will be essay type and involve explanation in writing, graphs, and diagrams

Exams will be based on reading assignments and content covered in discussions and lectures. Students will take exams in location and times determined in agreement between students and instructor.

Oral Exam (PhD students) – The oral exam will be taken with all doctoral students at the same time and will last 2 hours. Each student will have to answer 1-2 questions per oral exam with minimal assistance from classmates.

Research Articles (MS and PhD students) – Students will be assigned research articles for reading and will submit a summary for grading and participate in a discussion of the article. There will be 1-2 articles per module. The instructor will use the rubric in the table below to assign points on the written and discussion of the article.

Participation (MS and PhD students) – This will be determined based on the student's preparedness, involvement, and contribution in classroom discussions. Students are required to participate through a presentation of answers on the board and discussion of applied questions. Students need to 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 answer and discuss all questions and problems assigned for the day.

Students will receive participation points for presenting their understanding of concepts, complementing comments from other students, or responding questions from the instructor following the rubric outlined below. Students will also earn participation for presentation and discussion of research or lay press articles, and submission of handwritten answers to discussion questions provided in the course. 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.

The instructor will use the rubric in the table below to assign points based on participation in class and online submissions

Excellent	10 pts	<ul style="list-style-type: none"> - Defines, describes, and illustrates concepts - Explains, assesses, and criticizes ideas - Demonstrates preparation and reading of assignments
good	8 pts	<ul style="list-style-type: none"> - Defines, describes, and illustrates concepts - Explains, assesses, and criticizes ideas - Evidence of reading assignments, but not fully prepared
reasonable	6 pts	<ul style="list-style-type: none"> - Defines, describes, and illustrates concepts - Explains, assesses, or criticize some ideas - Evidence of incomplete reading of assignments and preparation
basic	4 pts	<ul style="list-style-type: none"> - Defines and describes some concepts - Explains but cannot assess and criticize ideas - Clearly unprepared and lacking evidence of reading assignments
bare minimum	2 pts	<ul style="list-style-type: none"> - Defines and describes some concepts - Unable to explain, assess, or criticize ideas - Clearly unprepared and lacking evidence of reading assignments
unacceptable	0 pt	<ul style="list-style-type: none"> - Refuses to engage in discussion or answer questions when asked - Engaged into inappropriate behaviors (using cell phone, social media, visiting irrelevant websites) - Not present or no submission of hand-written answers and drawings

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.

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. “More detailed information regarding current UF grading policies can be found here: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.”

Letter Grade	A	B+	B	C+	C	D+	D	E
Percent of Total Points	90.00-100%	85.00-89.99%	80.00-84.99%	75.00-79.99%	70.00-74.99%	65.00-69.99%	60.00-64.99%	0-59.99%
GPA of Each Letter Grade	4	3.33	3	2.33	2	1.33	1	0

WEEKLY COURSE SCHEDULE:

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

Topic 7 – Muscle Fatigue

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 Responses to Resistance Exercise

Tentative dates and course plan are on the next page.

WEEKLY COURSE SCHEDULE:

Date	Class activity	Note	Module
12-Jan	Course Intro		1
14-Jan	topics 1-3	lecture	
19-Jan	topics 1-3	lecture	
21-Jan	topics 1-3	Quiz & discussion	
26-Jan	topics 4-6	lecture	
28-Jan	topics 4-6	Quiz & discussion	
02-Feb	topics 7-8	lecture	
04-Feb	topics 7-8	Quiz & discussion	
09-Feb	Review		
11-Feb	Exam 1		
16-Feb	topic 1-2	lecture	2
18-Feb	topics 3-4	lecture	
23-Feb	topics 1	Quiz and discussion	
25-Feb	topics 2-4	Quiz and discussion	
02-Mar	topics 5-6	lecture	
04-Mar	topics 5-6	Quiz and discussion	
09-Mar	topic 7	lecture	
11-Mar	topic 7	Quiz and discussion	
16-Mar	Review		
18-Mar	Exam 2		
23-Mar	topics 1-2	lecture	3
25-Mar	topics 1-2	Quiz and discussion	
30-Mar	topic 3	lecture	
01-Apr	topic 3	Quiz and discussion	
06-Apr	topic 4	lecture	
08-Apr	topic 4	Quiz and discussion	
13-Apr	topic 5	Lecture	
15-Apr	topic 5 + Review	Quiz and Discussion	
20-Apr	Exam 3		

SUCCESS AND STUDY TIPS:

To succeed in this course, students need to prepare regularly and in advance of attending lecture and discussion sessions. Lectures are available online for previewing and reviewing content. Students should check topics and assignments on the course schedule above, watch online lectures, read assigned text, and attend class to ask questions. Reading of assigned text should be done once, paying attention to the content. Students should avoid seeking sources beyond those provided in the course to supplement their reading. This can lead to confusion and overloading

During lectures and discussions, students should write key concepts in 'bullet point' style, while following the discussion and presentation of concepts. The goal is to understand, not memorize, the material. The best forms of studying are: 1) to draw diagrams and figures to help understand and remember physiological processes, 2) discuss course material with classmates, 3) review points presented in the discussion session. Items 1 and 2 should be done before lecture and discussion sessions. Item 3 should be done after the discussion on the same or immediately following day. This will help retain the concepts learned.