

## ADVANCED EXERCISE PHYSIOLOGY

APK4112 ~ 3 CREDITS ~ SPRING 2020

**INSTRUCTOR:** Terence E. Ryan, Ph.D.  
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**OFFICE HOURS:** Thursday 1:00pm – 1:45pm or by appointment

**MEETING TIME/LOCATION:** FLG 265, Tuesday | Period 8 (3:00pm – 3:50pm)  
FLG 265, Thursday | Period 7-8 (1:55pm – 3:50pm)

**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:** For this course, students MUST access two resources: (1) the textbook, and (2) the CANVAS course website. Options regarding how to gain access to these required course materials are described below.

*Textbook: "University of Florida custom e-book Advanced Exercise Physiology", Human Kinetics (ISBN 9781492563136).*

This custom textbook is available from Human Kinetics and has been generated by mixing several book chapters into a custom book which will cover the focused materials directly related to this course. Students can purchase the e-book through the UF

bookstore or the publisher's website (search by the ISBN number above). There will be reading assignments from the textbook and quiz and exam questions may come from these reading assignments even if the material is not covered in lecture or discussions.

**COURSE FORMAT: LECTURES:** It is recommended that students attend all in-class lectures and complete reading assignments in advance of lectures. Lectures will be delivered by the instructor to cover complex physiological principles and facilitate a critical understanding of the course material. *\*\*NOTE: many lecture slides contain animations and details that are not present on the PDF versions posted to CANVAS – you will need to attend lectures to obtain this information.* **DISCUSSIONS:** During double-period class sessions, students are expected to engage in discussions in small peer-groups. These discussions are designed to enhance critical thinking skills and facilitate detailed understanding of physiological concepts. These discussions will involve 'case-study' like questions in which the students will be expected to present an answer to a question to the class based on their understanding of the physiology. **QUIZZES:** There will be weekly quizzes administered in class using Canvas. The quizzes will be at the beginning of the class and will consist of problem-solving exercises and short questions (multiple choice, true/false, fill-in-the blank). Students will take the quiz individually or in groups at the discretion of the instructor. The quiz might address material that has been covered in lecture, discussion, or in the reading assignments. Canvas based quizzes are structured such that you must answer each question before moving on to the next question. You CANNOT go back and change answers to questions. No class materials, notes, or other sources can be used during the quizzes. Unauthorized use of materials will be considered a violation of the Academic Honor Code. **EXAMS:** There will be three exams in the course, one at the end of each module. Each exam will contain 15-25 questions and will last 90 minutes. Exams will be based on reading assignments and content covered in discussions and lectures. The exam will be in groups of 2-3 students so that physiological concepts can be discussed in small group settings. Each student will complete their own exam and should submit their individual answers independently. In case of disagreement, students can answer questions differently from the group in their individual submission. 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.

**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: LECTURE:** Attendance of lectures is highly encouraged as posted lecture slides do not contain all information. **DISCUSSIONS:** Attendance of discussion sessions is required and participations points will be assigned based on performance during discussion sessions.

**PERSONAL CONDUCT POLICY:** Students are expected to exhibit behaviors that reflect highly upon themselves and our University.

- Read and refer to the course syllabus
- Arrive to class **on time** (i.e. a few minutes early)
- Show respect for the course instructor and classmates
- Use professional, courteous standards for all emails and discussions:
  - Descriptive subject line
  - Address the reader using proper title and name spelling
  - Body of emails should be concise but with sufficient detail
  - No textspeak (e.g. OMG, WTH, LOL)
- No texting or checking social media sites during class time
- No personal conversations during class time
- Adherence to the UF Student Honor Code:
  - (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>)
  - Report any condition that facilitates academic misconduct to appropriate personnel
  - Any use, access, or handling of unapproved materials during a quiz or exam will result in a zero on the assignment – at a minimum.
  - Honor code violations of any kind will not be tolerated and all allegations will be reported to the Dean of Students Office

**EXAM MAKE-UP POLICY:** Unexcused absences/availability for quizzes/exams will result in a zero. Students who are ill or have an emergency that prevents from taking the exam during the time available are responsible for contacting the instructor prior to the absence. Make-up exams are offered at the discretion of the instructor.

A student experiencing an illness should visit the UF Student Health Care Center 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](http://www.dso.ufl.edu)) and follow the DSO Care Team procedures for documentation and requesting a make-up assignment (<https://www.dso.ufl.edu/care/courtesy-letters/>). 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.

Canvas: A ticket number received from UFIT Helpdesk must accompany requests for make-ups due to technical issues (see Academic Resources below). The ticket number will document the time and date of the problem. If the time and date are past the assignment deadline, the request may not be granted. You must e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Requirements for class attendance and make-up exams, assignments, and other work are consistent with the university policies that can be found at <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**COURSE EVALUATIONS:** Students in this class are participating in GatorEvals. This evaluation system is designed to be more informative to instructors so that teaching effectiveness is enhanced and to be more seamlessly linked to UF's CANVAS learning management system. Students can complete their evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Thank you for serving as a partner in this important effort.

## GETTING HELP:

### Health and Wellness

- U Matter, We Care: If you or a friend is in distress, please contact [umatter@ufl.edu](mailto: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](mailto: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:

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

Evaluation Components (number of each)	% of Total Grade
Exams (3)	45.0%
Quizzes (11)	35.0%
Participation (3)	20.0%
Extra Credit Quiz (1)	1%

**Exams** – Exams will be at the end of each module (three exams, one per module). Each exam will contain 15-20 questions and will last 50-90 min. Exams will be based on reading assignments and content covered in discussions and lectures. The exam will be in groups of 2-3 students so that physiological concepts can be discussed in small group settings. Each student will complete their own exam and should submit their individual answers independently. In case of disagreement, students can answer questions differently from the group in their individual submission. 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.

**In-class Quizzes** – There will be quizzes administered in class using Canvas. The quiz might address a topic that has been discussed during the module and/or will be discussed on the day of the quiz. These quizzes will be at the beginning of class and will consist of problem-solving exercises or short-questions. Students will take the quiz individually or in groups at the discretion of the instructor based on the type and nature of questions. There will be 3-10 questions per quiz. You must answer each question before moving on to the next question. You CANNOT go back and change answers to questions. No class materials, notes, or other sources can be used during the quizzes.

Unauthorized use of materials will be considered a violation of the Academic Honor Code. The lowest quiz score for each student will be dropped.

**Participation** – Students will be assessed on their ability to effectively communicate their comprehension of the physiological principles covered in course materials. This can be achieved through discussion sessions and answering in-class questions during lectures. This will be determined based on the student’s preparedness, involvement, and contribution in classroom discussions. Students are required to participate at least once each module to receive all points in this category. 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 are expected to present their answer to discussion questions through illustrations and graphs based their understanding of the physiology. Notebooks are not allowed to be brought to the front while answering questions. 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 (see below). Regular contributions to weekly discussions are highly encouraged, even for students that cannot get up to the board each day.

A rubric for assignment of participation points is below:

Excellent	20 pts	<ul style="list-style-type: none"> <li>- Defines, describes, and illustrates concepts</li> <li>- Explains, assesses and criticizes ideas</li> <li>- Demonstrates preparation and reading of assignments</li> </ul>
Good	18 pts	<ul style="list-style-type: none"> <li>- Defines, describes, and illustrates concepts</li> <li>- Explains, assesses and criticizes ideas</li> <li>- Evidence of reading assignments, but not fully prepared</li> </ul>
Reasonable	16 pts	<ul style="list-style-type: none"> <li>- Defines, describes, and illustrates concepts</li> <li>- Explains, assesses, or criticize some ideas</li> <li>- Evidence of incomplete reading of assignments and preparation</li> </ul>
Basic	14 pts	<ul style="list-style-type: none"> <li>- Defines and describes some concepts</li> <li>- Explains but cannot assess and criticize ideas</li> <li>- Clearly unprepared and lacking evidence of reading assignments</li> </ul>
Bare Minimum	12 pts	<ul style="list-style-type: none"> <li>- Defines and describes some concepts</li> <li>- Unable to explain, assess, or criticize ideas</li> <li>- Clearly unprepared and lacking evidence of reading assignments</li> </ul>
Unacceptable	0 pts	<ul style="list-style-type: none"> <li>- Refuses to engage in discussion or answer questions when asked</li> <li>- Engaged into inappropriate behaviors (using cell phone, social media, visiting irrelevant websites)</li> <li>- Not present</li> </ul>

**Extra Credit** - Students can earn up extra credit (up to 1% added to final grade) in this course through scores on an in-class extra credit quiz. This quiz is structured the same as in-class quizzes but will provide students an opportunity to obtain extra credit points. Make-ups for extra credit quizzes will not be allowed, except for unusual circumstances which have been discussed with the instructor in advance of the quiz.

**GRADING SCALE:** Any discrepancies with points displayed in the gradebook should be pointed out to the instructor before the last day of class. Because the lowest quiz score is dropped and extra credit is offered, there is no curve for this course and final grades will NOT be rounded. **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	Percent of Total Points Associated with each Letter Grade	GPA Impact of Each Letter Grade
A	94.00 – 100%	4.00
A-	90.00 – 93.99%	3.67
B+	85.00 – 89.99%	3.33
B	80.00 – 84.99%	3.00
B-	75.00 – 79.99%	2.67
C+	70.00 – 74.99%	2.33
C	65.00 – 69.99%	2.00
C-	60.00 – 64.99%	1.67
D+	55.00 – 59.99%	1.33
D	50.00 – 54.99%	1.00
I	0.00 – 49.99%	0.00

## WEEKLY COURSE SCHEDULE:

*Any changes to this schedule will be posted in CANVAS as an announcement.*

Date	Class Activity	Module
09-Jan	Course introduction	Module 1
14-Jan	Lecture 1 (Bioenergetics and enzyme kinetics)	
16-Jan	Discussion 1 (Bioenergetics and enzyme kinetics) <b>Quiz 1</b>	
21-Jan	Lecture 2 (Glucose transport and glycogenolysis)	
23-Jan	Discussion 2 (Glucose transport and glycogenolysis) <b>Quiz 2</b>	
28-Jan	Lecture 3 (Glycolysis, pyruvate, and lactate metabolism)	

30-Jan	Discussion 3 (Glycolysis, pyruvate, and lactate metabolism) <b>Quiz 3</b>	
04-Feb	Lecture 4 (Lipolysis and mitochondrial metabolism)	
06-Feb	Discussion 4 (Lipolysis and mitochondrial metabolism) <b>Quiz 4</b>	
11-Feb	Review for Exam 1	
13-Feb	<b>EXAM 1</b>	
18-Feb	Lecture 1 (Structure of skeletal muscle, sarcomere, SERCA)	Module 2
20-Feb	Discussion 1 (Structure of skeletal muscle, sarcomere, SERCA) <b>Quiz 5</b>	
25-Feb	Lecture 2 (Neuromuscular transmission, EC coupling, calcium, cross-bridge)	
27-Feb	Discussion 2 (Neuromuscular transmission, EC coupling, calcium, cross-bridge) <b>Quiz 6</b>	
03-Mar	SPRING BREAK	
05-Mar	SPRING BREAK	
10-Mar	Lecture 3 (Passive and active muscle mechanisms)	
12-Mar	Discussion 3 (Passive and active muscle mechanisms) <b>Quiz 7</b>	
17-Mar	Lecture 4 (Muscle fatigue)	
19-Mar	Discussion 4 (Muscle fatigue) <b>Quiz 8</b>	
24-Mar	Extra Credit Quiz 1 and Exam 2 Review Session	
26-Mar	<b>EXAM 2</b>	
31-Mar	Lecture 1 (Autonomic/Hormonal and CV reflexes)	Module 3
02-April	Discussion 1 (Autonomic/Hormonal and CV reflexes) <b>Quiz 9</b>	
07-April	Lecture 2 (Smooth Muscle)	
09-April	Discussion 2 (Smooth Muscle) <b>Quiz 10</b>	
14-April	Lecture 3 (Intrinsic control of blood flow, hyperemia, CV response to resistance exercise)	
16-April	Discussion 3 (Intrinsic control of blood flow and hyperemia) <b>Quiz 11</b>	
21-April	<b>EXAM 3</b>	

### SUCCESS AND STUDY TIPS:

- 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.