

NEUROMUSCULAR ASPECTS OF EXERCISE

APK 4115 3 CREDITS SPRING 2024

INSTRUCTOR: **Professor Evangelos A. Christou**

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Preferred Method of Contact: UF email

OFFICE HOURS: By appointment

MEETING TIME/LOCATION: FLG 210, MWF period 1 (7:25 am – 8:15 am)

COURSE DESCRIPTION: Designed to provide an in-depth analysis of muscle structure and function; how muscles produce movement; adaptation of muscle to resistance training, endurance training and various manipulations used in rehabilitation; adaptation of muscle to disuse; and muscle responses to injury.

PREREQUISITE KNOWLEDGE AND SKILLS: APK 3110C with grade of C.

REQUIRED AND RECOMMENDED MATERIALS:

RM Enoka. Neuromechanics of Human Movement. 5th edition. Human Kinetics. ISBN 978-1-4504-5880-1 (optional – not required). Handouts and review papers will be provided for specific topics (see schedule).

COURSE FORMAT: The typical structure of the class is the following: Monday - lecture on the topic of the week; Wednesday – relevant presentation; Friday – Take home quiz. I take absences only during the presentation days.

COURSE LEARNING OBJECTIVES: Upon completion of this course, the student will be able to:

1. Knowledge: Discuss, explain, and defend subject matter relevant to neuromuscular physiology
2. Skills: Discuss, explain, and compare specific skills related to neuromuscular physiology
3. Professionalism: Present and explain vital, relevant concepts in neuromuscular physiology in a professional manner

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: Make every effort to attend all lectures. Although attendance will not affect your grades directly, it could influence them indirectly. Numerous concepts that will be discussed only during class (and are not in the book) will be part of your weekly quizzes.

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

PERSONAL CONDUCT POLICY:

Technology: The use of cell phones* (and the like) is strictly prohibited during lectures and exams. Any cell phone or other electronic device used during an exam will be considered a violation of the student honor code (i.e., cheating) and will result in stiff penalties. Laptop computers are welcome in class as long as you are using it for class-related work. Surfing the web, checking your email, making Facebook posts, or anything of that nature is strictly prohibited. Violation of this policy will result in point deductions at the discretion of the instructor.

Communication: You are responsible for checking announcements and course postings on E LEARNING. This is how your course instructor will communicate with you. All course grades will be posted on E LEARNING. Any discrepancies should be pointed out to the instructor on or before the last day of finals week.

Academic Honesty: 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."

Any student found violating this honor code will receive a zero for that exam or assignment and may be assigned other educational sanctions at the instructor's discretion.

<https://sccr.dso.ufl.edu/process/student-conduct-code/>

EXAM MAKE-UP POLICY: Unexcused absences on quiz/exam days will result in a zero on the quiz/exam. If you are ill or have an emergency that prevents you from taking the quiz at the scheduled time, it is your responsibility to contact the instructor as soon as possible. Documentation of the illness or emergency will be required. It is in the discretion of the instructor to provide a make-up quiz/exam or count the next one twice.

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>.

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 unmute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

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 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:

Course Examinations and Grading

| Activity/Assignment | Points |
|-----------------------------------|---------------|
| 1. Quizzes/Assignments x 11 | 22 |
| 2. Group Presentation | 28 |
| 3. Participation in presentations | 5 |
| 3. Exam 1 | 15 |
| 4. Exam 2 | 30 |
| TOTAL POINTS | 100 |

Quizzes/Assignments (22%)

There will be a total of 11 quizzes and you will not be allowed to drop ANY.

All quizzes will be TAKE HOME. You will receive them the day of the quiz (usually Friday) and they will be due the following class day (typically Monday).

You will need to submit them electronically in Canvas under assignments. Questions will come from material (lectures and presentations) presented to you since the previous quiz and watching relevant TED talks.

Group Presentation (28%)

This presentation will be based on a research article that I will provide for you. I will randomly assign you into presentation groups and I will post the list of groups on CANVAS. There will be 3-5 people per group.

The length of the presentation should be 10 minutes and should be in the format of a powerpoint presentation. The 10 minute limit is strict and you will be cut short if you go over your time. My suggestion, therefore, is to practice the presentation ahead of time. Conciseness, clarity, and information delivery will be part of your grade. There will be a 5 minute question-answer session after each presentation. This presentation will worth 28% of your course grade.

Each member will grade the other group members for participation in the presentation. The average score from your group mates will be multiplied with my grade. For example, if I gave your group 28% for your presentation and your group mates scored your participation to the presentation at 50%, your individual score will be 14%.

Presentation Participation (5%)

There are 11 presentation days (typically Wednesdays but not always-see syllabus). You are required to come to every presentation and sit on a pre-assigned seat for that day. Only for those days I will take attendance. If the absence is unexcused, then I will subtract 1% from that individual.

Exams

There will be two exams for this course. Each exam will comprise of <30 multiple choice questions for the whole 50 min period. I reserve the right to change the exam into essay and fill in the blank questions.

Exam 1 (15%): This exam will cover the lectures and presentations from January 8th to February 15th. This exam will count for 15% of your grade.

Exam 2 (30%): This exam will cover the lectures and presentations from February 19th to April 19th. This exam will count for 30% of your grade.

GRADING SCALE: The total points earned from exams, quizzes, writing assignment, attendance, and presentation will be summed. There is no curve for this course. I reserve the right to round up grades for students who show exceptional participation in class. However, under most circumstances GRADES WILL NOT BE ROUNDED UP!!! If you earn a 79.94%, you will receive a C+, not a B. The following grading scale will be used to assess students in this course. For more detailed information on current UF grading policies, please see the undergraduate catalog web page:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies>

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 | Points Needed to Earn Each Letter Grade | Percent of Total Points Associated with Each Letter Grade | GPA Impact of Each Letter Grade |
|--------------|---|---|---------------------------------|
| A | ≥ 93 | 93.00-100.0% | 4.0 |
| A- | 90-93 | 90.00-92.99% | 3.67 |
| B+ | 87.00-89.99 | 87.00-89.99% | 3.33 |
| B | 80.00-86.99 | 80.00-86.99% | 3.0 |
| C+ | 77.00-79.99 | 77.00-79.99% | 2.33 |
| C | 70.00-76.99 | 70.00-76.99% | 2.0 |
| D+ | 67.00-69.99 | 67.00-69.99% | 1.33 |
| D | 60.00-66.99 | 60.00-66.99% | 1.0 |
| E | 0-59.99 | 0-59.99% | 0 |

WEEKLY COURSE SCHEDULE:

This approximates what the semester will consist of.

This outline is subject to change at any point during the semester.

First half

| Week | Date | Lecture Topic | Assign. |
|--|------------|--|---------------|
| MODULE 1 – BASICS OF THE NEUROMUSCULAR SYSTEM | | | |
| 1 | M – Jan 8 | Syllabus explanation / Organization How to present scientific data in 10 minutes *see pre-recorder lecture on how to present scientific data | |
| | W – Jan 10 | Synaptic transmission/ Muscle Structure | Lecture 1 |
| | F – Jan 12 | <i>Take Home Quiz 1</i> | QUIZ 1 |
| 2 | M – Jan 15 | NO CLASS – MARTIN LUTHER KING DAY | |
| | W – Jan 17 | Movement mechanics and Contraction Types | Lecture 2 |
| | F – Jan 19 | <i>Take Home Quiz 2</i> | QUIZ 2 |
| MODULE 2 – THE MOVEMENT ACTUATOR | | | |
| 3 | M – Jan 22 | Motor units I - Structure | |
| | W – Jan 24 | <i>Presentation – Groups 1,2</i> | Lecture 3 |
| | F – Jan 26 | <i>Take Home Quiz 3</i> | QUIZ 3 |
| 4 | M – Jan 29 | Motor units II - Activation | Lecture 4 |
| | W – Jan 31 | <i>Presentation – Groups 3,4</i> | |
| | F – Feb 2 | <i>Take Home Quiz 4</i> | QUIZ 4 |
| 5 | M – Feb 5 | Electromyography | Lecture 5 |
| | W – Feb 7 | <i>Presentation – Groups 5,6</i> | |
| | F – Feb 9 | <i>Take Home Quiz 5</i> | QUIZ 5 |
| MODULE 3 – NEURAL CONTROL OF MOVEMENT | | | |
| 6 | M – Feb 12 | Neural control of force | Lecture 6 |
| | W – Feb 14 | <i>REVIEW SESSION for EXAM 1</i> | |
| | F – Feb 16 | EXAM 1 | EXAM 1 |

Second half

| Week | Date | Lecture Topic | Assign. |
|---|--------------|--|----------------|
| 7 | M – Feb 19 | Motor Output Variability | Lecture 7 |
| | W – Feb 21 | <i>Presentation – Groups 7,8</i> | |
| | F – Feb 23 | <i>Take Home Quiz 6</i> | QUIZ 6 |
| 8 | M – Feb 26 | Voluntary actions | Lecture 8 |
| | W – Feb 28 | <i>Presentation – Groups 9,10</i> | |
| | F – Mar 1 | <i>Take Home Quiz 7</i> | QUIZ 7 |
| 9 | M – Mar 4 | Spinal reflexes and Automatic responses | Lecture 9 |
| | W – Mar 6 | <i>Presentation – Groups 11,12</i> | |
| | F – Mar 8 | <i>Take Home Quiz 8</i> | QUIZ 8 |
| MODULE 4 – ACUTE ADJUSTMENTS TO EXERCISE | | | |
| 10 | M – Mar 11 | NO CLASS – SPRING BREAK | |
| | W – Mar 13 | NO CLASS – SPRING BREAK | |
| | F – Mar 15 | NO CLASS – SPRING BREAK | |
| 11 | M – Mar 18 | Acute Adjustments – <i>Fatigue</i> | Lecture 10 |
| | W – Mar 20 | <i>Presentation – Group 13,14</i> | |
| | F – Mar 22 | <i>Take Home Quiz 9</i> | QUIZ 9 |
| 12 | M – Mar 25 | Acute Adjustments – <i>Stress and Visual Feedback</i> | Lecture 11 |
| | W – Mar 27 | <i>Presentation – Groups 15,16</i> | |
| | F – Mar 29 | <i>Take Home Quiz 10</i> | QUIZ 10 |
| MODULE 5 – CHRONIC ADAPTATIONS TO EXERCISE | | | |
| 13 | M – Apr 1 | Chronic Adaptations – Aging | Lecture 12 |
| | W – Apr 3 | <i>Presentation – Groups 17,18</i> | |
| | F – Apr 5 | <i>Take Home Quiz 11</i> | QUIZ 11 |
| 14 | M – Apr 8 | Chronic Adaptations – Movement Disorders | Lecture 13 |
| | W – Apr 10 | <i>Presentation – Groups 19,20</i> | |
| | F – Apr 12 | Make Up Day – if needed | |
| 15 | M – Apr 15 | Chronic Adaptations – Motor Learning | Lecture 14 |
| | W – Apr 17 | <i>Presentation – Groups 21,22</i> | |
| | F – Apr 19 | <i>REVIEW SESSION for EXAM 2</i> | |
| 16 | M – Apr 22 | EXAM 2 | EXAM 2 |
| | W – Apr 24 | Make Up Day – if needed | |
| | F – Apr 26 | Reading Day | |
| | Tue – Apr 30 | NO FINAL EXAM We could use the Final Exam Time: 8:00 PM - 10:00 PM for make up time, if needed. | |

SUCCESS AND STUDY TIPS:

Successful students in my class typically do the following:

1. Do not miss classes throughout the semester. A lot of the quiz and test material are given in class. A significant amount of information is not on the slides or in the book.
2. Take the presentation very seriously and start preparing ahead of time. The group presentation requires anywhere from 10-15 hours of outside class work.
3. Come prepared to the review sessions before the exam. Many concepts are clarified in those sessions.