

MOVEMENT NEUROSCIENCE

APK 4144 ~ 3 CREDITS ~ SPRING 2020

INSTRUCTOR: Julia T. Choi, PhD
Office: FLG 132C
Office Phone: 352-294-1720
Email: juliachoi@ufl.edu
Preferred Method of Contact: Email

OFFICE HOURS: Thursday 10:30 – 11:30 or by appointment

MEETING TIME/LOCATION: FLG 245, T period 2-3 (8:30 – 10:25) and R period (9:35 – 10:25)

COURSE DESCRIPTION: Covers both anatomical and physiological aspects of movement-related components of the nervous system from a functional perspective. Topics include: neuronal signaling; synaptic transmission, somatosensation; proprioception; nociception; vision and eye movements; lower vs. upper motor neurons; cortical, basal ganglia and cerebellar regulation of movement; and posture.

PREREQUISITE KNOWLEDGE AND SKILLS: (APK 2100C and APK 2105C with minimum grades of C) and (sophomore standing or higher) and Applied Physiology and Kinesiology major.

REQUIRED AND RECOMMENDED MATERIALS: Text Book: Neuroscience Sixth Edition - Editor: Purves et al.

Textbook website with animations, flashcards, etc: https://oup-arc.com/access/neuroscience-sixth-edition-student-resources#tag_animations

Tutis Vilis Web Page: <http://www.tutis.ca/Senses/index.htm>

COURSE FORMAT: This class is primarily lecture-based with additional in-class demonstrations, discussions, and short videos.

COURSE LEARNING OBJECTIVES: The course provides an in-depth overview and treatment of the sensory and motor systems of the nervous system responsible for regulating movement. By the end of this course, students should be able to:

- Describe electric signaling of nerve cells as they pertain to movement.
- Elaborate how sensory systems including somatosensory, proprioception, pain, visual, and auditory systems, relate to movement.
- Discuss each sensory system's peripheral anatomy and physiology, as well as central brain physiology for processing each type of sensory signal.
- Define the function of lower motor neurons, upper motor neurons, cortical physiology of movements, basal ganglia physiology, cerebellar physiology, posture, and eye movements.
- Understand mechanisms of repair and regeneration, cognition and memory, speech and language motor control, as they relate to movement.
- Students should also be able to integrate across all of the above topics to demonstrate a holistic understanding of how the central nervous system controls movement.

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: Although there are no points for attendance, students will greatly benefit from regular class attendance. There will be in-class quizzes throughout the semester to promote attendance and keeping up with reading assignments.

PERSONAL CONDUCT POLICY: Students are expected to exhibit behaviors that reflect highly upon themselves and our University. Students will be expected to engage in class discussions in a manner that demonstrates respect for their peers and their instructor. They will be expected to engage in learning while in the classroom, as opposed to texting, emailing, or reading materials unrelated to the course. Students in this class must adhere to the UF Student Honor Code and will be reported for failure to do so. 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, as students in this course, 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 in this class.

EXAM MAKE-UP POLICY: Make-up exams and other work can be requested given that there is a medical, family, or other emergency that deems the need for a make-up. 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>.

NAME CHANGE IN CANVAS: 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 me on any issues related to the class. If your preferred name is not the name listed on the official UF roll, please let me know as soon as possible. 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.

ACCOMMODATING STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<https://disability.ufl.edu/students/get-started/>). 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 can 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:

Please let me know if you are experiencing any personal or academic difficulties this semester. In addition, the following resources are available:

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:

EXAM 1 (25%)

EXAM 2 (25%)

EXAM 3 (25%) (NOT CUMULATIVE)

QUIZZES (25%)

****THERE WILL BE 6-8 QUIZZES THROUGHOUT THE SEMESTER**

*****ALL EXAMS INCLUDE TRUE AND FALSE, MULTIPLE CHOICE.**

GRADING SCALE: The instructor will make every effort to post quiz and exam scores on canvas within one week of the assessment.

More detailed information regarding current UF grading policies can be found here:

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

Any requests for 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.

GRADE SCALE

A (4.0)	93 – 100%
A- (3.67)	90 – 92.99%
B+(3.33)	87 – 89.99%
B (3.00)	83 – 86.99%
B- (2.67)	80 – 82.99%
C+(2.33)	77 – 79.99%
C (2.00)	73 – 76.99%
C- (1.67)	70 – 72.99%
D+(1.33)	67 – 69.99%
D (1.00)	63 – 66.99%
D- (0.67)	60 – 62.99%
E (0.00)	LESS THAN 60%

WEEKLY COURSE SCHEDULE:

Section 1: Neural Signaling

Week 1

- Jan 7 *Chapter 1 – The Organization of the System*
- Jan 9 *Chapter 2 – Electrical Signals of Nerve Cells 1*

Week 2

- Jan 14 *Chapter 2,5 – Electrical Signals of Nerve Cells 2*
- Jan 16 *Chapter 5 – Synaptic Transmission*

Section 2: Sensation and Sensory Processing

Week 3

- Jan 21 *Chapter 9 – The Somatic Sensory System 1*
Quiz 1
- Jan 23 *Chapter 9 – The Somatic Sensory System 2*

Week 4

- Jan 28 *Chapter 10 – Pain*
Quiz 2
- Jan 30 *Chapter 11 – Vision: The Eye*

Week 5

Feb 4 *Chapter 12 – Central Visual Pathways*
Quiz 3

Feb 6 Review for Exam 1

Week 6

Feb 11 **Exam 1** (covers chapters 1,2,5,9,10)

Feb 13 *Chapter 13 – The Auditory System*

Week 7

Feb 18 *Chapter 14 – Vestibular system*

Feb 20 Multisensory integration: Is seeing believing?

Section 3: Sensorimotor Control of Movement**Week 8**

Feb 25 *Chapter 16 – Lower Motor Neuron Circuits 1*
Quiz 4

Feb 27 *Chapter 16 – Lower Motor Neuron Circuits 2*

Week 9

SPRING BREAK

Week 10

Mar 10 *Chapter 17 – Upper Motor Neuron Control 1*
Quiz 5

Mar 12 *Chapter 17 – Upper Motor Neuron Control 2*

Week 11

Mar 17 Review for Exam 2

Quiz 6

Mar 19 Current topics

Week 12

Mar 24 **Exam 2** (covers section 2, chapters 11,12,13,14,16)

Mar 26 *Chapter 18 – Modulation of Movement by the Basal Ganglia*

Week 13

Mar 31 *Chapter 18,19 – Modulation of Movement by the Basal Ganglia*

Apr 2 *Chapter 19 – Modulation of Movement by the Cerebellum*

Week 14

Apr 7 *Chapter 20 – Eye Movements and Sensorimotor Integration*
Quiz 7

Section 4: Complex Brain Functions and Cognition

Apr 9 *Chapter 27 – Cognitive Functions*

Week 15

Apr 14 *Chapter 33 – Speech and Language*
Quiz 8

Apr 16 Catch-up day

Week 16

Apr 21 Last class, Review for Exam 3

**Exam 3 will occur during Final Exam time scheduled for this course (NOT cumulative, covers chapters 17,18,19,20,27,33). Wednesday, April 29, 10:00 am – 12:00 pm

SUCCESS AND STUDY TIPS:

Students that perform best in this class have high attendance and complete the readings prior to class. In addition, students that do not look at their phones or open their laptops during class tend to perform better.