

MOVEMENT NEUROSCIENCE

APK 4144 ~ 3 CREDITS ~ SPRING 2021

INSTRUCTOR: Julia T. Choi, PhD
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Preferred Method of Contact: Email or Zoom

OFFICE HOURS: Tuesday and Thursday 10:30-11:30am via Zoom

MEETING TIME/LOCATION: Tuesday | period 2-3 (8:30am – 10:25am)
Thursday | period 3 (9:35am – 10:25am)

HyFlex lectures will be held in FLG0285 (for section 1F42) and remotely via Zoom. Discussion sessions will be held on Zoom only.

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: The following textbook is required:

Neuroscience (6th Edition). Edited by Dale Purves, George J. Augustine, David Fitzpatrick, William C. Hall, Anthony-Samuel LaMantia, Richard D. Mooney, Michael L. Platt, and Leonard E. White. Oxford University Press. ISBN: 9781605353807

This textbook is also available as an ebook from Redshelf.

<https://redshelf.com/book/813174/>

COURSE FORMAT: The course includes two meetings per week. One day of the week will be dedicated to HyFlex lectures and the other day the class will meet on Zoom for a quiz review followed by active learning. Active learning sessions include discussion of questions in small peer groups. These discussions are designed to enhance critical thinking skills and facilitate detailed understanding and application of fundamental concepts. Students will be expected to present an answer to a question to the class based on their understanding of the neurophysiology.

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

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.

The Zoom class sessions are an important component of remote learning. All participants in the Zoom class sessions are expected to adhere to the following rules in order to ensure the best possible learning environment:

- Arrive on time (i.e., a few minutes early). Log in with your full first and last name as listed on the class roster. Students will be admitted to the “waiting room” before being admitted to the class.
- Taking screenshots or screen recordings of virtual classrooms are not allowed without written consent by the instructor.
- **Turn on your video when possible.** It is helpful to be able to see each other. Make sure everyone can see you (if cameras are being used). Posture before the camera must be conducive to active learning and participation (e.g., no reclining).
- Avoid noisy activities like typing while your microphone is on. Mute your microphone when you are not contributing. This helps eliminate background noise.
- Use the Chat field for constructive comments only. The chat window is not a place for socializing. If the chat is filled up with random comments, I will not be able to address questions/concerned that are relevant to class.
- **Stay present and focused.** Please close any apps on your device that are not relevant.

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.

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 by e-mail or otherwise. I would like to acknowledge your preferred name, and pronouns that reflect your identity. 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.

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. 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. 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. 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 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-19 FACE-TO-FACE COURSE STATEMENT: 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. 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.

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/>

INCLUSION, DIVERSITY, EQUITY, AND ACCESSIBILITY RESOURCES

For 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

GRADING:

QUIZZES (15%)

DISCUSSIONS (10%)

EXAM 1 (25%)

EXAM 2 (25%)

EXAM 3 (25%) - NOT CUMULATIVE

****QUIZZES** – There will be a quiz administered using Canvas in each Module. The quiz will be available after each lecture, and students must complete the quiz before the discussion section for each Module. The quiz will cover materials that has been presented in lectures and/or assigned reading. Quizzes will include True/False, Multiple choice, Multiple answers, and Short answer questions. Students may use course materials and their own notes during the quizzes, but students must not use any other sources (e.g., web searches) during the quiz. The lowest quiz score will be dropped and not included in the final grade.

DISCUSSIONS – There will be in-class discussions throughout the semester. Students will work in small peer groups via Zoom breakout rooms. Students may use course materials and their own notes. Communication with other groups or checking the web is prohibited. After small group discussions, each team will be asked to present their answers to the class. Students will receive discussion points for presenting their understanding of concepts, complementing comments from other students, or responding question from the instructor following the rubric outlined below. Regular contributions to weekly discussions are highly encouraged. If the instructor calls a student who is absent, the student will receive a zero unless the absence is justified according to UF policies. In the event that lack of time limits the possibility for all students to participate, the instructor will rely on the answers submitted by the student to assign participation points. Rubric for assignment of discussion points are as follows:

Excellent	5 pts	<ul style="list-style-type: none"> - Defines, describes and illustrates concepts - Explains, assesses and criticizes ideas - Demonstrates preparation and reading of assignments
Good	4 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	3 pts	<ul style="list-style-type: none"> - Defines and describes some concepts - Partially explains but cannot assess and criticize ideas - Evidence of incomplete reading of assignment and preparation
Basic	2 pts	<ul style="list-style-type: none"> - Defines and describes some concepts - Partially explains but cannot assess and criticize ideas - Clearly unprepared and lacking evidence of reading assignments
Bare minimum	1 pt	<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 - Not present or no submission of answers to discussion

****EXAMS** – Each exam will consist of 50 questions, plus 2 bonus questions at the end. Exams will include True/False, Multiple choice, Multiple Answers and Short answer questions. Students are not permitted access to any kind of materials or notes during these exams. Students will have 60 minutes to complete each exam.

**** Quizzes and Exams will consist of the following types of questions:**

- True/False
- Multiple choice: choose ONE answer that is BEST.
- Multiple answers: select ALL correct answers to get full points. Partial points will be given based on % items correct

- Short answer (fill in the blanks, single sentence or paragraph)

GRADING SCALE: The instructor will make every effort to post quiz and exam scores on canvas within one week of the assessment. Students should contact the instructor as soon as possible if they feel there is an error in the gradebook. The lowest quiz score will be dropped in the final course grade. Final grades will NOT be rounded. 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:

- Module 1 – Studying the nervous system
- Module 2 – Neuronal signaling
- Module 3 – Synapses
- Module 4 – Somatosensation
- Module 5 – Vision 1 (Retina)
- Module 6 – Vision 2 (Central visual pathways)
- Module 7 – Vestibular system
- Module 8 – Lower motor neurons
- Module 9 – Upper motor neurons
- Module 10 – Basal ganglia
- Module 11 – Cerebellum
- Module 12 – Eye movement
- Module 13 – Cognitive Functions

Tentative dates and course plan are below. Any changes to this schedule will be posted in CANVAS as an announcement.

Date	Class Activity/Assignment	Format
January 12	Course Introduction Lecture 1 (Module 1)	Hyflex
January 14	Quiz 1 (Module 1) Lecture 2 (Module 2)	Hyflex
January 19	Quiz 2 (Module 2) Discussion (Module 2)	Zoom breakout
January 21	Lecture 3 (Module 3)	Hyflex
January 26	Quiz 3 (Module 3) Discussion (Module 3)	Zoom breakout
January 28	Lecture 4 (Module 4)	Hyflex
February 2	Quiz 4 (Module 4) Discussion (Module 4)	Zoom breakout
February 4	Lecture 5 (Module 5)	Hyflex
February 9	Quiz 5 (Module 5) Discussion (Module 5)	Zoom breakout
February 11	Review	Hyflex
February 16	Exam 1 (Modules 1-5)	Section 1F42 – pen and paper exam in FLG0285 Section 1G42 – HonorLock CANVAS exam
February 18	Lecture 6 (Module 6)	Hyflex
February 23	Quiz 6 (Module 6) Discussion (Module 6)	Zoom breakout
February 25	Lecture 7 (Module 7) “Recharge day”	Pre-recorded lecture
March 2	Quiz 7 (Module 7) Discussion (Module 7)	Zoom breakout
March 4	Lecture 8 (Module 8)	Hyflex
March 9	Quiz 8 (Module 8) Discussion (Module 8)	Zoom breakout
March 11	Lecture 9 (Module 9)	Hyflex
March 16	Quiz 9 (Module 9) Discussion (Module 9)	Zoom breakout
March 18	Review	Hyflex
March 23	Exam 2 (Modules 6-9)	Section 1F42 – pen and paper exam in FLG0285 Section 1G42 – HonorLock CANVAS exam
March 25	Lecture (Module 10)	Hyflex

March 30	Quiz 10 (Module 10) Discussion (Module 10)	Zoom breakout
April 1	Lecture (Module 11)	Hyflex
April 6	Quiz 11 (Module 11) Discussion (Modules 11)	Zoom breakout
April 8	Lecture (Module 12)	Hyflex
April 13	Quiz 12 (Module 12) Discussion (Modules 12)	Zoom breakout
April 15	Lecture (Module 13)	Hyflex
April 20	Quiz 13 (Module 13) Discussion (Module 13)	Zoom breakout
April 29	Exam 3 (Modules 10-13)	Section 1F42 – pen and paper exam in FLG0285 Section 1G42 – HonorLock CANVAS exam

SUCCESS AND STUDY TIPS:

Success in any university course requires dedication and hard work on the part of the student. Attending class regularly and studying on a daily basis is essential to excel in learning movement neuroscience. Here are my tips for learning in this course:

- Complete the readings prior to class.
- Go to class and participate in small-group discussions.
- Make sure you know the neuroscience vocabulary. Use the flashcard from Neuroscience, 6th edition Student Resources to **remember** these neuroscience terms.
- Practice drawing diagrams and figures to help **understand** and **analyze** neural circuits and processes.
- Read quiz and exam questions carefully before answering.
- Ask the instructor questions if you don't understand a concept presented in class.
- Study daily. Review material in small sections (don't get overwhelmed by reading the entire chapter)