

MOVEMENT NEUROSCIENCE

APK 4144 ~ 3 CREDITS ~ FALL 2020

INSTRUCTOR: **Shahab Vahdat, PhD**
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Preferred Method of Contact: Email

OFFICE HOURS: Office hours are Tuesday 10AM – 12PM, or by appointment

MEETING TIME/LOCATION: T | Period 7 (1:55 PM - 2:45 PM)
R | Period 7 - 8 (1:55 PM - 3:50 PM)

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; vestibular; audition; lower vs. upper motor neurons; cortical, basal ganglia and cerebellar regulation of movement; cognition, and speech in relation to movement control.

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.

This textbook is also available as an ebook from Redshelf: <https://redshelf.com/book/813174/>

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

Copies of the lecture slides will be posted on the CANVAS course website.

COURSE FORMAT: The course includes two virtual meetings per week. One day of the week will be dedicated to live lectures followed by active learning. Active learning sessions include discussion of questions in small peer groups followed by an in-class assignment. The discussions are designed to enhance critical thinking skills and facilitate detailed understanding of fundamental concepts. The other day the class will meet for a quiz followed by live lectures.

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 and synaptic transmission as they pertain to movement.
- Elaborate how sensory systems including somatosensory (proprioception, touch, pain), visual, auditory, and vestibular 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 higher-level cognitive function, 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 directly, students will greatly benefit from regular class attendance. There will be 10 in-class quizzes, and 13 in-class assignments throughout the semester to promote attendance and keeping up with reading assignments. Hence, there will be a quiz or assignment during almost every session and student are required to attend the class to be able to participate. 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. 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 focused. Please close any apps on your device that are not relevant.

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.

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.

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>.

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.

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/>

GRADING:

EXAM 1 (20%)

EXAM 2 (20%)

EXAM 3 (20%) (NOT CUMULATIVE)

QUIZZES (25%)

ASSIGNMENTS (15%)

ASSIGNMENTS - There will be 13 in-class assignments throughout the semester. Students will work in small peer groups during the Discussion time in zoom breakout rooms, and then each student will be assigned to answer one question in a paragraph form, keeping writing as concise as possible. Students may use course materials and their own notes. Communication with other groups or checking the web is prohibited. Rubric for assignment points are as follows:

Satisfactory	2 pts	<ul style="list-style-type: none">- Defines, describes and illustrates concepts- Explains, assesses and criticizes ideas- Demonstrates preparation and reading of assignments
Basic	1 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
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

QUIZZES – There will be 10 quizzes administered in class using Canvas. The quiz might address a topic that has been presented through video or live lectures, discussed during

the module, and/or assigned reading. 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. The lowest quiz score will be dropped and not included in the final quiz grade.

* All Quizzes and Exams include True and False, Multiple choices. Using your ebook or textbook is NOT ALLOWED.

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

WEEKLY COURSE SCHEDULE:

Sep 1	Module 1 – Studying the Nervous System
Sep 3	Module 2 – Neural Signaling Assignment 1 (CH 1)
Sep 8	Quiz 1 (CH 2) Module 2 – MetaNeuron Lab Exercise
Sep 10	Module 3 – Synapses Assignment 2 (CH 5)
Sep 15	Quiz 2 (CH 5) Module 4 – Somatosensation

- Sep 17 Module 4 – Somatosensation
Assignment 3 (CH 9 – 10)
- Sep 22 **Quiz 3 (CH 9 – 10)**
Module 5 – Vision 1
- Sep 24 Module 5 – Vision 1
Assignment 4 (CH 11)
Module 6 – Vision 2
- Sep 29 Module 6 – Vision 2
Assignment 5 (CH 12)
- Oct 1 **Quiz 4 (CH 11 – CH 12)**
Catch up and Exam review
- Oct 6 Module 7 – Hearing
Assignment 6 (CH 13)
- Oct 8 **Exam 1** (covers chapters 1, 2, 5, 9, 10, 11, 12)
- Oct 13 Module 8 – Balance and Posture
Assignment 7 (CH 14)
- Oct 15 **Quiz 5 (CH 13 – CH 14)**
Module 9 – Lower Motor Neurons
- Oct 20 Module 9 – Lower Motor Neurons
Assignment 8 (CH 16)
- Oct 22 **Quiz 6 (CH 16)**
Module 10 – Upper Motor Neurons
- Oct 27 Module 10 – Upper Motor Neurons
Assignment 9 (CH 17)
- Oct 29 **Quiz 7 (CH 17)**
Catch up and Exam review
- Nov 3 Module 11 – Basal Ganglia
- Nov 5 **Exam 2** (covers chapters 13, 14, 16, 17)

- Nov 10 Module 11 – Basal Ganglia
Assignment 10 (CH 18)
- Nov 12 Module 12 – Cerebellum
Assignment 11 (CH 19)
- Nov 17 **Quiz 8 (CH 18)**
- Nov 19 Module 13 – Eye Movement
Assignment 12 (CH 20)
- Nov 24 **Quiz 9 (CH 19 - 20)**
Module 14 – Cognitive Functions
- Dec 1 Module 14 – Speech and Language
Assignment 13 (CH 27 - 33)
- Dec 3 **Quiz 10 (CH 27 - 33)**
Review day
- Dec 8 Catch up and Exam review

****Exam 3** will occur during Final Exam time scheduled for this course (NOT cumulative, covers chapters 18, 19, 20, 27, 33) on Thursday, December 17th, 3 pm – 5 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.