

Movement Neuroscience

APK4144 | Class # 28261 | 3 Credits | Fall 2025

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Course Info

INSTRUCTOR

Zheng Wang, Ph.D.
Office: FLG 146
Office Phone: 352-273-6450
Email: zheng.wang@ufl.edu
Preferred Method of Contact: **Business email**

OFFICE HOURS

Tuesday 3:00 PM – 4:30 PM

MEETING TIME/LOCATION

In-person session (Aug-21 ~ Dec-2):

- T | Period 7 (1:55 PM – 2:45 PM)
- R | Period 7-8 (1:55 PM – 3:50 PM)

Location: FLG 0265

Online materials:

- Canvas on UF e-Learning (<https://elearning.ufl.edu/>) & the Canvas Mobile App by Instructure

COURSE DESCRIPTION

Covers 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; and cognition.

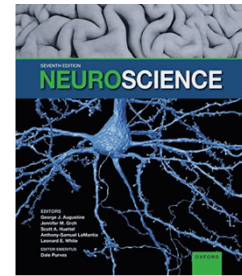
PREREQUISITE KNOWLEDGE AND SKILLS

(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

Textbook: Neuroscience 7th Edition - Editor: Purves et al.

Lecture slides and video recordings are on the CANVAS course website.



COURSE FORMAT

The course includes two weekly meetings, a 2-hour “long session” and a 1-hour “short session”. All students shall read the directed book chapter(s) before attending the long session. The long session is divided into two halves. The first half involves introductory lectures. The second half includes discussions of questions in small peer groups, followed by an in-class assignment. The discussions are designed to enhance critical thinking and facilitate a detailed understanding of fundamental concepts. In the 1-hour short session, the class will meet for a quiz followed by an introductory lecture. All course lectures are pre-recorded and posted on Canvas.

COURSE LEARNING OBJECTIVES:

The course provides an 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 the 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 the above-mentioned topics to demonstrate a holistic understanding of how the central nervous system controls movement.

University Policies

University policies are summarized [here](#). This link will direct students to a separate webpage that will provide all required academic policies, such as attendance, grading, personal conduct, DRC and evaluation verbiage, as well as campus academic, health, and wellness resources.

Course Policies

ATTENDANCE POLICY

- **Attendance (7 in total) will be randomly checked throughout the semester.** Only students with seven attendances will receive 1% of the total grade as extra credit at the end of the semester.
- **There will be 12 in-class quizzes and 12 in-class assignments throughout the semester** to promote attendance and keep up with reading assignments. Hence, there will be a quiz or assignment during almost every session. **Students 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 to avoid penalties for participation.

- **NO LATE SUBMISSIONS of in-class quizzes and assignments.**
- **The lowest score from in-class quizzes and assignments will be removed from the final score calculation.**

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.

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 several 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.

Appropriate Use of AI Technology

The UF Honor Code strictly prohibits *cheating*. The use of any materials or resources prepared by another person or Entity (inclusive of generative AI tools) without the other person or Entity’s express consent or without proper attribution to the other person or Entity is considered *cheating*. Additionally, the use of any materials or resources, through any medium, which the Faculty / Instructor has not given express permission to use and that may confer an academic benefit to a student, constitutes *cheating*.

IN-CLASS RECORDING

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or

between a student and the faculty or guest lecturer during a class session. Publication without permission of the instructor is prohibited.

To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

EXAM POLICY

If a student arrives late to the exam, they will still be permitted to take the exam (without penalty) with the remaining time left, as long as no other student has submitted their exam and has left. If a student is late to the exam and at least one student has already completed their exam and has left the classroom, the late-arriving student will be subjected to the policy below and will incur a penalty deduction on their exam. In the case that a student is late and another student has already left OR a student misses an exam due to an unexcused reason (i.e. overslept, mixed up the exam time, etc.), the exam can be taken with a 40% penalty if the student notifies the instructor of their unexcused absence within 24 hours of the original exam time or with a 50% penalty if notification to their instructor is between 24-48 hours from the original exam time. If a student does not notify their instructor within 48 hours of the original exam time, the student will receive a zero grade for that exam. **Cell phones will be collected prior to each exam.**

EXAM MAKE-UP POLICY

There will be NO make-up exams unless exceptional conditions occur (as defined by the University of Florida Undergraduate Catalog). Please see this link for more information:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>. Prior permission from the professor is required.

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 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.bluer.com/ufl/>. Thank you for serving as a partner in this important effort.

Privacy: A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

DEPARTMENT ADMINISTRATORS

For suggestions or concerns related to APK courses or programming, please reach out to any of the following:

- Dr. David Vaillancourt (he/him), APK Department Chair, vcourt@ufl.edu
- Dr. Demetra Christou (she/her), APK Department Vice Chair, ddchristou@hnp.ufl.edu
- Dr. Steve Coombes (he/him), APK Graduate Coordinator, scoombes@ufl.edu
- Dr. Anna Gardner (she/her), APK Undergraduate Coordinator, akgardner@ufl.edu

Grading

NON-CUMULATIVE EXAMS (60%)

- EXAM 1 (20%)
- EXAM 2 (20%)
- EXAM 3 (20%)

QUIZZES (25%)

ASSIGNMENTS (15%)

QUIZZES – There will be 12 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 multiple-choice questions. Using your ebook or textbook is **NOT ALLOWED**.

* All Quizzes and Exams are administered on Canvas. **A 20% total score deduction will be applied if students decide to take paper-based quizzes and exams unless exceptional conditions occur.**

ASSIGNMENTS - There will be 12 in-class assignments throughout the semester. Students will work in small peer groups during the Discussion time in class, and then each student will be assigned to answer two questions in a paragraph form, keeping writing as concise as possible. Students may use course materials and their own notes. The lowest assignment score will be dropped and not included in the final assignment grade. Rubric for assignment points is 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

Extra Credit

- Attendance (7 in total) will be randomly checked throughout the semester. Only students with seven attendance points will receive 1% of the total grade as extra credit at the end of the semester. Extra credit automatically populates on the gradebook once students accumulate 7 attendance points.
- Research volunteer opportunity. This opportunity may be available only for some occasions/semesters. When available, the course instructor will provide related information to the students.
- Department and college events/activities. Attending events such as the DK Stanley lecture and the Center for Exercise Science (CES) research seminars can be counted as attendance credit. The instructor will provide related information throughout the semester.

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/>.

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%

CRITICAL DATES & UF OBSERVED HOLIDAYS

- **November 11:** Veterans Day
- **November 25, 27:** Thanksgiving Break
- Complete list available here: <https://catalog.ufl.edu/UGRD/dates-deadlines/pdfs/calendar2526.pdf>

WEEKLY SCHEDULE

Dates	Lecture topics	Quizzes	Assignments
Aug 21	Orientation Module 1 – Studying the Nervous System, CH 1 Intro to Module 2	Test Quiz	Assignment 1
Aug 26	Module 2 – Neural Signaling, CH 2	Quiz 1 (M.1)	
Aug 28	Module 3 – Synapses, CH 5	Quiz 2 (M.2)	Assignments 2 & 3
Sept 2	Intro to Module 4	Quiz 3 (M.3)	
Sept 4	Module 4 – Somatosensation, CH 9-10		Assignment 4
Sept 9	Exam 1 Review	Quiz 4 (M.4)	
Sept 11	Exam 1 (covers Modules 1-4)		
Sept 16	Intro to Module 5		
Sept 18	Module 5 – Vision 1, CH 11		Assignment 5
Sept 23	Intro to Module 6	Quiz 5 (M.5)	
Sept 25	Module 6 – Vision 2, CH12		Assignment 6
Sept 30	Intro to Module 7	Quiz 6 (M.6)	
Oct 2	Module 7 – Hearing, CH 13		Assignment 7
Oct 7	Intro to Module 8	Quiz 7 (M.7)	
Oct 9	Module 8 – Balance and Posture, CH 14		Assignment 8
Oct 14	Homecoming Break		
Oct 16	Exam 2 Review	Quiz 8 (M.8)	
Oct 21	Intro to Module 9		
Oct 23	Exam 2 (covers Modules 5-8)		
Oct 28	Module 9 – Lower Motor Neurons, CH 16		
Oct 30	Module 9 – Lower Motor Neurons, CH 16 Intro to Module 10		Assignment 9
Nov 4	Module 10 – Upper Motor Neurons, CH 17	Quiz 9 (M.9)	
Nov 6	Module 10 – Upper Motor Neurons, CH 17		Assignment 10
Nov 11	Intro to Module 11	Quiz 10 (M.10)	
Nov 13	Module 11 – Basal Ganglia, CH 18		Assignment 11
Nov 18	Intro to Module 12	Quiz 11 (M.11)	
Nov 20	Module 12 – Cerebellum, CH 19		Assignment 12
Dec 2	Exam 3 Review	Quiz 12 (M. 12)	

****Exam 3 (covers Modules 9 – 12)** will occur during Final Exam time scheduled for this course on **Dec/11/2025 @ 3:00 PM – 5:00 PM.**

SUCCESS AND STUDY TIPS

Students that perform best in this class have high attendance, watch the lecture videos 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.