UF College of Health & Human Performance
Department of Applied Physiology and Kinesiology
UNIVERSITY of FLORIDA

LOCOMOTION

PET 5936 ~ 3 CREDITS ~ SPRING 2022

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

OFFICE HOURS: by appointment

MEETING TIME/LOCATION: FLG 225, W periods 6-8 (12:50 pm – 3:50 pm)

COURSE DESCRIPTION: This is a graduate level course with a central theme of biomechanics and neural control of locomotor movement. Topics will include basic gait function, neural control of locomotion, gait energetics, gait disorders and motor learning for gait rehabilitation. Students will develop quantitative skills in gait analysis through in-class and homework assignments.

PREREQUISITE KNOWLEDGE AND SKILLS: Students should have basic neurophysiology and MATLAB knowledge. Students should already know how to work with different data structures, how to write MATLAB scripts/functions, and how to plot in MATLAB.

REQUIRED AND RECOMMENDED MATERIALS: Readings will come from select textbook chapters and research articles. MATLAB software will be required to perform in-class activities and homework assignments. Assigned readings and homework datasets will be made available on CANVAS. The MATLAB software is available through UF Apps (https://info.apps.ufl.edu/). If students prefer to own the MATLAB software, they can purchase a student version directly from Mathworks (https://www.mathworks.com/products/matlab/student.html).

COURSE FORMAT: This course will use a combination of lectures, discussion of readings and in-class assignments. Students are expected to come prepared by reading the assigned chapters/articles each week before class. Part of the class time will be devoted to working in small groups. These group assignments are designed to enhance critical thinking skill and to facilitate detailed understanding and application of the course materials.

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

1. Describe the normal kinematics and kinetics of the gait cycle
2. Explain the interactions between neural control and biomechanics of locomotion
3. Perform basic stride analysis and interpret motion/EMG data
4. Discuss how biomechanical assessment can be used to guide clinical treatment interventions
5. Critically evaluate scientific literature in the area of locomotion neuromechanics

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: Attendance is mandatory. Every unexcused absence will result in 1% deduction.

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. 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, 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 or TA in this class.

EXAM MAKE-UP POLICY: 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.

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/.

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 opti on 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. Rachael Seidler, APK Graduate Coordinator, rachaelseidler@ufl.edu
- Dr. Joslyn Ahlgren, APK Undergraduate Coordinator, jahlgren@ufl.edu

GRADING:

The following breakdown will be used in determining the grade in this course

Homework	50%
Notebook	25%
In-class discussion	25%
Total	**100%**

Homework: Each homework must be completed individually. Each homework assignment will include instructions and a due date that can be found on CANVAS. Homework assignments turned in late will have 50% of the points deducted from the graded score. Late submissions will not be accepted 2 days after due date.

Notebook: Students must submit a notebook after the last class. The notebook should contain the student's observations/perspective from reading the course materials before each class, questions to be shared in class, as well as perspectives that are generated from the discussions during class.

Discussion: Students will receive discussion points for presenting their understanding of concepts, complementing comments from other students, or responding question from the instructor. Regular contributions to weekly discussions are highly encouraged.

GRADING SCALE: The following grading scale will be used to assess students in this course. 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 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	Percent of Total Points Associated with Each Letter Grade	GPA Impact of Each Letter Grade
A	90.00-100%	4.0
B+	87.00-89.99%	3.33
B	80.00-86.99%	3.0
C+	77.00-79.99%	2.33
C	70.00-76.99%	2.0
D+	67.00-69.99%	1.33
D	60.00-66.99%	1.0
E	0-59.99%	0

WEEKLY COURSE SCHEDULE:

Tentative dates and course plan are below. Changes to this schedule will be posted in CANVAS.

Date	**Topic**	**Due**
1/5	Fundamentals of gait analysis	
1/12	Basic gait functions	
1/19	Muscle activation pattens during walking	Homework 1: Matlab function
1/26	Energetics of locomotion	
2/2	Dynamic gait stability	
2/9	Neural control of locomotion I: spinal networks	Homework 2: Stride analysis
2/16	Neural control of locomotion II: sensory feedback	
2/23	Neural control of locomotion III: descending control	
3/2	Locomotor adaptation and learning	Homework 3: Motion data analysis
3/9	*Spring break*	

3/16	Gait and cognition	
3/23	Gait and balance in older adults	
3/30	Pathological gait: Parkinson’s disease	Homework 4: EMG analysis
4/6	Pathological gait: Stroke neurorehabilitation	
4/13	‘Real-world’ gait analysis	
4/20	Wrap-up discussion	Homework 5