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

BIOMECHANICAL BASIS OF MOVEMENT

APK3220C ~ 3 ~ FALL 2020

INSTRUCTOR: **Blain Harrison, Ph.D, ATC, CSCS**
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Preferred Method of Contact: email

OFFICE HOURS: Zoom office hours MWF 11:30am – 12:30pm

MEETING TIME/LOCATION: Lectures delivered via Zoom on scheduled days/time: MWF 10:40 – 11:30AM
Zoom link provided on Canvas course home page.

COURSE DESCRIPTION: Fundamentals of kinematics and kinetics related to human movement. Basics of biomechanics applied to the concepts of injury prevention and performance improvement. Overview of various biomechanical data collection and analysis.

PREREQUISITE KNOWLEDGE AND SKILLS: APK 2100C and MAC1140 with minimum grades of C; or PHY2048 or PHY2053 with minimum grade of C

REQUIRED MATERIALS:

Hall, S. *Basic Biomechanics 7th Edition*. McGraw-Hill. 2015.

myDartfish Express mobile app - available on both iOS and Android platforms

Muscle and Motion anatomy application - https://www.muscleandmotion.com/log-in_page_strength_training/ (username: jahlgren@ufl.edu password: 123)

TopHat - https://app.tophat.com/e/894405

COURSE FORMAT:
One chapter in the required text is emphasized per week. Lecture videos are recorded during the weekly Zoom meetings at the regularly scheduled class time. Students are encouraged to attend the live zoom sessions, but may also opt to view the recordings of the sessions on their own time.

Course Learning Objectives:

1. Identify biomechanical principles/concepts and describe the impact of biomechanics research on daily life
2. Describe the basic technology behind biomechanical instrumentation with a focus on motion capture
3. Identify the planes of motion and axes of rotation involved in a given human movement pattern
5. Solve biomechanical problems related to exercise, sport, and health using calculations related to:
    a. Linear and angular kinematic variables (including position, velocity, acceleration)
    b. Linear and angular kinetic variables (including force, torque, momentum, impulse, work, power, and energy)
    c. Estimating the center of mass position
    d. Fluid mechanics
6. Describe how fluid forces influence human motion involving liquids and air
7. Explain the basic mechanical properties, interactions, and functions of bones, tendons, ligaments, muscle, joints, and cartilage

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: This course will be administered asynchronously on Canvas. Weekly assignments will have specific due dates, but the student may read course content and watch course videos at their leisure. The following link outlines the UF Attendance Policy found in the undergraduate Catalog
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

PERSONAL CONDUCT POLICY: 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: No make-up exams are offered. Students who will be unavailable on the day of an exam may provide the instructor with evidence of their excuse and may be permitted the opportunity to complete the exam early at the discretion of the instructor. 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 (http://www.dso.ufl.edu/drc/). 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 feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu or directly in CANVAS. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open.

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/

GRADING:

Evaluation Components (number of each)	Points Per Component	Weighted % of Total Grade
Midterm Exam	50 points	25%
Module Quiz (10)	100 pts	20%
Chapter Reading/TopHat	~250 points	10%
Comprehensive Final Exam	75 points	30%
Applied Biomechanics Assignments (10)	100 points	15%

Weekly Chapter Reading Assignments – Each week students will have one participation homework assignment due on Sundays involving reading comprehension of the chapter covered that week in class. Each reading comprehension assignment is worth 5-15 points and all will be available on Monday of each week.

Module Quiz - A total of 10 quizzes pertaining to each week's module is due each Sunday throughout the semester with the exception of weeks 1, 4, 8, 11, and 13. Each 10 question quiz is available on Monday of the week it is assigned and is completed using the HonorLock online proctoring service. The module quizzes are untimed but must be completed in a single sitting. Students will NOT be allowed the use of any outside resources on the quizzes. The quizzes are designed to take 15-20min to complete, so Honorlock reports indicating a student spent longer than 20min on the quiz will be scrutinized closely. Students are allowed 2 attempts, if desired, on each module quiz, with the average score between the 2 attempts counting as the grade for the quiz. Students satisfied with their grade on the first attempt should not complete a second attempt.

Midterm Exam – The midterm exam will consist of 50 multiple-choice questions, 1 point per question. Questions may require the application of course material in both quantitative and qualitative scenarios. Students will complete the exam using the HonorLock online proctoring service on the day designated on the course schedule. The midterm exam will be untimed but must be completed in a single sitting. Students will NOT be allowed the use of any outside resources on the exam. The exam is designed to take 60 - 75min to complete, so Honorlock reports indicating a student spent longer than 75min on the exam will be scrutinized closely.

Applied Biomechanics Assignments - A total of 10 Applied Biomechanics Assignments are assigned during the semester with the exception of weeks 1, 4, 7, 8, and 13. The first 5 assignments may require the use of the Muscle and Motion website and the second 5 assignments will require the use of the Dartfish Express mobile application. These assignments consist of 10 multiple choice questions that require the aforementioned applications when answering. Honorlock is not required to complete these assignments.

Comprehensive Final – The final exam will consist of 75 multiple-choice questions each worth 1 point. Questions may require the application of course material in both quantitative and qualitative scenarios. Students will complete the exam using the HonorLock online proctoring service on the day designated on the course schedule. The midterm exam will be untimed but must be completed in a single sitting. Students will NOT be allowed the use of any outside resources on the exam. The exam is designed to take 100 - 120min to complete, so Honorlock reports indicating a student spent longer than 120min on the exam will be scrutinized closely.

TopHat

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. Questions administered in class count towards your final grade. Each lecture will include approximately 5 questions worth 1 point each (as participation points). In-class TopHat questions will amount to 10% of your final grade.

You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An email invitation will be sent to you by email, but if don't receive this email, you can register by simply visiting our course website: **https://app.tophat.com/e/894405** Note: our Course Join Code is **894405** Top Hat will require a paid subscription, and a full breakdown of all subscription options available can be found here: www.tophat.com/pricing.

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email (support@tophat.com), the in app support button, or by calling 1-888-663-5491.

GRADING SCALE: All course assignments are administered and graded within the APK3220 Canvas course page, so students will have access to all grades as they submit assignments. Any assignment that requires the instructor to manually grade some aspect of it will be graded within one week of its due date, including the semester exams and final project. Final Grades will be rounded up at .5 and above.

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	92.5-100%	4.0
A-	89.50 – 92.49%	3.7
B+	86.50-89.49%	3.33
B	79.50-86.49%	3.0
C+	76.50-79.49%	2.33
C	69.50-76.49%	2.0
D+	66.50-69.49%	1.33
D	59.50-66.49%	1.0
E	0-59.49%	0

WEEKLY COURSE SCHEDULE: * = Quiz @ = Applied Assignment

Week	Dates	Topic	Chapter
1	(8/31-9/4)	What is Biomechanics	1
2*@	(9/7-9/11)	Kinematic Concepts	2
3*@	9/14-18	Kinetic Concepts	3
4	(9/21-25)	Biomechanics of Bone	4
5*@	(9/28-10/2)	Biomechanics of Joints	5
6*@	(10/5-9)	Biomechanics of Muscle	6
7*@	(10/12-16)	Biomechanics of Upper Extremity	7
8	(10/19-23)	Biomechanics of Lower Extremity Midterm Exam – Friday 10/23	8
9*@	(10/26-30)	Biomechanics of Spine	9
10*@	(11/2-6)	Linear Kinematics	10
11	(11/9 - 13)	Angular Kinematics	11
12*@	(11/16 - 20)	Linear Kinetics	12
13	(11/23-27)	Equilibrium and Human Movement **Thanksgiving**	13
14*@	(11/30-12/4)	Angular Kinetics	14
15*@	(12/7-9)	Fluid Mechanics	15

FINAL EXAM: AVAILABLE FOR 24 HOURS BEGINNING WEDNESDAY 12/16/2020 AT 12:00AM

SUCCESS AND STUDY TIPS:

- Complete all assignments.
- Read textbook chapter carefully
- Practice math questions by replacing the numbers within the questions and solving the same type of questions with new numbers.