

University of Florida  
Department of Applied Physiology and Kinesiology  
APK3220C (Section 2803) Biomechanical Basis of Movement  
Fall 2017 Section 2803: T 5-6 (11:45 AM-1:40 PM) R 6 (12:50-1:40)  
Meeting Room: FLG 245

**Instructor:**

Matthew Terza M.S.

Office: FLG 151

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Office Hours: W, R 1:55-2:55

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**Course Description**

This course is designed to be challenging milestone course that provides qualitative and quantitative understanding of mechanics as they apply to living organisms. Biomechanics utilizes multiple disciplines to understand the way in which force provides a basis for movement.

Movement is a fundamental aspect of human life. In a qualitative way, we perform biomechanical analysis of ourselves and others through the interpretation of sensory information. In this course, we will focus on developing a solution process, set of terminology, and associated methods for formally quantifying, understanding, and optimizing human movement.

We will learn the basics of framing a biomechanical inquiry. Using fundamental methods for applying engineering principles to our observations we will answer some of the basic questions about our body and its interactions with the world we live in. This is primarily a lecture based course, but we will take time for discussion based learning that generates ideas on how the concepts apply across a spectrum of situations and professions. This course provides a basis for understanding health related problems of the musculoskeletal system from a biomechanical perspective. As clinicians and researchers this foundation can help us explain normal and abnormal mechanics of the body and make more informed decisions for the people we serve.

**Prerequisite Knowledge and Skills**

Prereq: junior or senior standing; APK 2100C and MAC 1140 with minimum grades of C; or PHY 2048 or PHY 2053 with minimum grade of C

**Course Objectives**

Learn terminology and concepts associated with the study of biomechanics.

Develop a solution process for answering biomechanical questions.

Learn to apply principal of kinematics and kinetics to the human body.

Conceptualize the mechanical architecture of the body.

Learn to evaluate real world situations from a biomechanical perspective.

**Required Textbook:**

This is an e-text and associated supplementary online tutorial course system. Both are required.

Connect Access Card for Basic Biomechanics

Edition: 7

Copyright: 2015

Susan Hall, University of Delaware

ISBN - 9781259309663

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

**Academic Honesty**

Cheating will not be tolerated in this course. All students are required to abide by the Academic Honesty Guidelines and Honor Code, which have been accepted by the University. Cheating is defined as the improper taking or tendering of any information or material, which shall be used to determine academic credit. Violations of the Honor Code will be handled according to the guidelines set by Student Judicial Affairs. 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 obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with me.

**Class Attendance and Participation Policy**

Students are expected to attend all classes (including those during Drop/Add week) and to have completed reading assignment prior to coming to class. Students are responsible for all material covered during lectures either spoken or written. Failure to attend class does not absolve students of the responsibility of learning the material covered. University excused absences will be treated in accordance with University of Florida policy. Class participation counts as 4% of your final grade. Class participation credit requires attendance and participation in class discussions. Below is the rubric for attendance and participation. Behavior that is less than preferred may result attendance and participation point reductions in accordance with this rubric. (15 pts is full credit)

Preferred (Full Points)	Acceptable (-0.5 pts)	Won't ask you to leave (-1 pts)	May ask you to leave (-2 pts)	Will ask you to leave (-3 pts)
Arrives on time  Comments are relevant and reflect understanding and good preparation Clear enthusiasm	Arrives no more than 5 min late  Comments are mostly relevant, but understanding may be slightly lacking  Not overly enthusiastic, but positive	Arrives no more than 10 min late  Comments are minimal ("yeah", "uh huh") and demonstrate poor preparation  Demeanor is sluggish	Arrives more than 10 min late  No comments are made even when called upon.  Sleeping, texting, disengaged	Absent  Disruptive or rude comments are made  Drawing others into disrespectful behaviors (showing texts, passing notes, etc.)

### **Personal Conduct Policy**

You are expected to treat your fellow classmates, TAs, and the instructor with respect and politeness. Things that will not be tolerated include (1) inappropriate use of technology during class or lab, (2) disrespectful language or actions, and (3) honor code violations. Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>. **Any use, access, or handling of technology (e.g., a cell phone) during an assessment will result in an honor code violation and the potential of a failing grade.**

### **Exam Make-Up Policy**

*Unexcused missed assessments will result in a zero on the assessment (this includes contacting the instructor **after** the assessment if you are ill). Make-up assessments will be given at the discretion of the instructor. To schedule a make-up assessment, please fill out the **make-up exam request form** posted in CANVAS and submit it to your course instructor as soon as possible. Documentation will be required. If you have a serious emergency or life event, please contact the Dean of Students Office ([www.dso.ufl.edu](http://www.dso.ufl.edu)) and they will contact your instructor so that you do not have to provide documentation of the emergency/death in order to get a make-up assessment. Requirements for class attendance and make-up exams, assignments, and other work are consistent with the university policies that can be found at <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.*

### **Getting Help**

For issues with technical difficulties for CANVAS, please contact the UF Help Desk at:

- [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu)
- (352) 392-HELP - select option 2
- <https://request.it.ufl.edu/>

Any requests for make-ups due to technical issues **MUST** be accompanied by the ticket number received from Helpdesk when the problem was reported to them. The ticket number will document the time and

date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are also available for you:

- Library Help Desk <http://guides.uflib.ufl.edu/content.php?pid=86973&sid=686381>
- Counseling and Wellness  
<http://www.counseling.ufl.edu/cwc/Self-Help-Library.aspx>

### **Accommodations for students with disabilities**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### **Accommodation of Special Needs**

In accordance with university policy, I make every effort to accommodate unique and special needs of students with respect to speech, hearing, vision, seating, or other disabilities. Please notify the Office of Disability Services to register for services.

### **Online course evaluation process**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. 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. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>. Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies

The University of Florida has enacted a policy of allowing NO food or drink of any kind in any campus classroom. This policy will be enforced during the meeting times of this course.

**\*Please note that the instructor reserves the right to alter the syllabus of schedule if it is determined that such a change will benefit the course and the students.**

### **Exams and Assignments**

There will be three semester exams (which are not comprehensive) and a Final Exam that is comprehensive. The exams will evaluate conceptual knowledge, critical thinking, and biomechanical quantitative skills. The exams will be primarily multiple choice and problem solving. **A scientific calculator will be needed for exams (Trig Functions)**. Online reading assignments and homework will be assigned through Canvas and McGraw Hill connect. These assignments will be due by the start of class on the due date listed. A semester group project will be assigned part way through the semester after we have covered some of the basic material. Make-up exams will only be given for University Excused Absences.

## **Grading**

### **Letter Grade**

90.00% - 100% = A

87.00% - 89.99% = B+

80.00% - 86.99% = B

77.00% - 79.99% = C+

70.00% - 76.99% = C

67.00% - 69.99% = D+

60.00% - 66.99% = D

<60.00 = E

Please use this link for the University Grades and Grading Policies

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

<b>Assessment</b>	<b>Points</b>	<b>Weight</b>
Exam 1	50 points	14 %
Exam 2	50 points	14 %
Exam 3	50 points	14 %
Final	100 points	29 %
Attendance/Participation	15 points	4 %
Project	50 points	14 %
Homework	30 points	9 %
Total	345 points	100 %

**Homework and Reading Assignments will be due before class starts on the day they are due.**

**Please bring pencil, paper, and scientific calculator to class.**

**Comprehensive Final Exam Date and Time: (15B) Friday December 15, 2017 10:00 AM- 12:00 PM**

**\*Please note that the instructor reserves the right to alter the syllabus of schedule if it is determined that such a change will benefit the course and the students.**

## Class Schedule

Week	Date	Lecture Topics	Assignments Due
1	8/22	Introduction, Syllabus	
		What is biomechanics, Online Learning	
	8/24	Trig Pretest, Developing Solution Process, Trig Review	App A-C, Info Card
2	8/29	Kinematic Concepts	Ch1, Ch 2
		Terminology	
	8/31	Setting Up Coordinate Systems	
3	9/5	Kinetic Concepts	Ch 3
		Kinetic Concepts	
	9/7	Biomechanics of Bone	Ch 4
4	9/12	Biomechanics of Joints 1	Ch 5,
		Biomechanics of Joints 2	
	9/14	Problem Set Review	HW1
5	9/19	Biomechanics of Muscle 1	Ch 6
		Biomechanics of Muscle 2	
	9/21	Exam 1 Review	HW2
6	9/26	<b>Exam 1</b>	
		<b>Exam 1</b>	
	9/28	Project Description	
7	10/3	Biomechanics of the Upper Extremities	Ch 7
		Concepts in Torque and Balance	
	10/5	Concepts in Torque and Balance	
8	10/10	Biomechanics of the Lower Extremities 1	Ch 8
		Biomechanics of the Spine	Ch 9
	10/12	Biomechanics of Squatting	
9	10/17	Project Progress Check and In Class Work Day	HW3
		Problem Set Review	
	10/19	Exam 2 Review	
10	10/24	<b>Exam 2</b>	
		<b>Exam 2</b>	
	10/26	Linear Kinematics	Ch 10
11	10/31	Projectile Motion	Ch 11
		Angular Kinematics	
	11/2	Linear Kinetics	Ch 12
12	11/7	Angular Kinetics	Ch 14
		Problem Set	HW 4
	11/9	Biomechanics of Gait	
13	11/14	Concepts in Stability	
		Equilibrium	Ch 13

	11/16	Fluid Mechanics	Ch 15
14	11/21	Problem Set	
		Exam 3 Review	HW 5
	11/23	<i>No Class Thanksgiving</i>	
15	11/28	<b>Exam 3</b>	
		<b>Exam 3</b>	
	11/30	Special Topics Lecture/ Final Exam Review	
16	12/5	<b>Court Case/Project Due</b>	Class Project
		<b>Court Case/Project Due</b>	
	12/7	<i>Reading Day</i>	
Final	12/15	<b>Final Exam</b>	

#### Study Tips for Class Success in Biomechanics

- Read from the text BEFORE attending lecture.
- Snow-ball the lecture notes. Begin studying lecture material immediately after the first lecture. Then, after the second lecture, begin your studies with day one lecture material. Continue this all the way up to the exam.
- Study with friends!
- Re-write questions. Taking complex questions and breaking them down to identify exactly what the question is REALLY asking for is very helpful. It is also very helpful to look at incorrect answer choices and identify what makes those choices wrong. Ask yourself, "How could I make that statement correct?" You can practice this with the critical thinking questions at the end of each chapter.

#### General Success Tips For Biomechanics

- Do not fall behind. This course moves at a FAST pace...and you can easily get overwhelmed if you procrastinate. Avoid studying at the last minute. Complete the homework as you go.
- Stay organized. Keep track of all important due dates and move through each day in a uniform manner so that you are always aware of what you have done and what is left to be completed.
- Ask questions and participate in class discussions
- Check CANVAS announcements/emails daily...just pretend it is Facebook for school. Your course instructor will post important and helpful information (such as friendly reminders of due dates) as announcements.
- Utilize office hours.
- Have a positive attitude! THIS STUFF IS COOL!