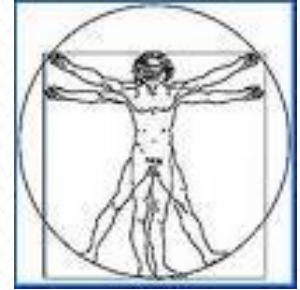


**APK 3220C Biomechanical Basis of Movement
Spring 2018**



Instructor: **Chris J Hass, Ph.D.**
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e-mail: cjhass@hhp.ufl.edu
Meeting Time(s): M.W.F Period 2
Meeting Place: FLG 220
Office Hours: **I will meet with you as much as you would like by appointment**

Course Description:

This course is designed to introduce students to the fundamentals of engineering (kinematics and kinetics) related to motor skills and human performance. Basic college mathematics and physics knowledge will be applied to problem solving in a classroom setting. While primarily a lecture course, experimental procedures and sport research techniques will be presented to facilitate lecture material.

Learning Objectives and Student Learning Outcomes:

At the end of this course the student will be able to demonstrate mastery of the following learning objectives:

- 1) Understand and describe the impact of biomechanics research on daily life.
- 2) Understand the mathematical relationship between position, velocity and acceleration and utilize these measures to quantify movement.
- 4) Understand and apply the equations of uniformly accelerated motion.
- 5) Understand Newton's laws and apply these laws in the calculation and analysis of the forces that cause motion.
- 6) Understand how the body's center of gravity location is computed and how the location informs movement capabilities.
- 7) Understand and apply appropriate mathematical techniques to calculate torque for basic lever systems.
- 8) Understand how fluid forces influence human motion in water
- 9) Understand and describe the effects of aging, injury, exercise, and rehabilitation on mechanical properties and their influence on movement quality.
- 10) Understand and explain the properties of bones, tendons, ligaments, and cartilage.
- 10) Explain the mechanical construction and movements of the body's joints with emphasis on torque production, stability, and flexibility.
- 11) Understand the biomechanical basis for exercise and sport technique and health related applications

Required Text:

Hall, Susan J. Basic Biomechanics, Boston, MA: McGraw-Hill.

Course Evaluation:

	<u>% of Grade</u>
Quizzes	2.0%
3 Minute Thesis	3.0%
Exam 1	26%
Exam 2	27%
Exam 3	27%
Group Presentation	15%
Total	100%

92.0% - 100% = A

90.0% - 91.9% = A-

87.0% - 89.99% = B+

82.0% - 86.99% = B

80.0% - 81.99% = B-

77.0% - 79.99% = C+

72.0% - 76.99% = C

70.0% - 71.99% = C-

67.0% - 69.99% = D+

62.0% - 66.99% = D

60.0% - 61.99% = D-

<60 = E

Information on current UF grading policies for assigning grade points:

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

Exams (80%): Exams may include questions in any of the following formats: quantitative problem solving, multiple choice, fill in the blank, short answer, or essay. Exam grade inquiries must be made in writing 48 hours after tests are handed back. Inquiries subject your exam to reevaluation, which could result in an increase or decrease in your grade.

Quizzes (2%) Randomly through the semester I will give ~ 3 question quiz (multiple choice, T/F) covering the lectures and lecture material provided. There will be ~ 5 quizzes.

Three Minute Thesis (3%): <http://threeminutethesis.org/>

Three Minute Thesis (3MT®) is a research communication competition developed by The University of Queensland which challenges students to present a compelling oration on their thesis and its significance in just three minutes in language appropriate to a non-specialist audience. 3MT is not an exercise in trivializing or 'dumbing-down' research but forces students to consolidate their ideas and crystallize research discoveries. In this class you will select two research articles from the biomechanics literature to present.

Frequently Asked Questions

<http://threeminutethesis.org/faqs>

<http://graduateschool.ufl.edu/student-life-and-support/3mt-competition>

Presentation (15%). You will form a group of 4-5 people and will present a 20 minute lecture on a biomechanics topic of your choosing. I have provided some example topics and presentations online to help guide you. Presentations will be given before the 2nd and 3rd exams.

Grading:

1 % percent of extra credit may be earned by participating in a research study or by submitting a critique of a research article dealing with a biomechanical topic and a two page typed critique of the article including your impressions. The article must be approved by the instructor prior to submission. Both the critique and a copy of the original article must be submitted for credit to be given and turned in no later than Friday, April 6th. The extra credit will be added directly to your final grade (i.e., if you attained a 79% for the class, with the addition of the extra credit you would receive a final class grade of 80%). More instructions will be provided later in the semester.

Please see your instructor at least 72 hours prior to your exam if circumstances arise that will prevent you from taking the exam.

EXAM MAKE-UP POLICY: Make-up exams will be given at the discretion of the instructor. Documentation will be required. Unexcused missed exams will result in a zero on the exam (this includes contacting the instructor after the exam if you are ill). You are absolutely not permitted a make-up exam for personal travel/vacations, so please make your travel arrangements accordingly. If you have a serious emergency or life event, please contact the Dean of Students Office (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 exam.

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>.

Notification of final grades will be made by the Registrar or you may check your grade by using CANVAS. Final grades will not be posted.

You must earn your grade! Grades will not be rounded! The extra credit assignment is designed to help any individual with a borderline grade.

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 Policies and Important Information:

PERSONAL CONDUCT POLICY:

Students are expected to exhibit behaviors that reflect highly upon themselves, our Department and our University:

- Read and refer to the syllabus
- Arrive to lecture on time (a few minutes early)
- Show respect for the authority of the course instructor and graduate TAs through politeness and use of proper titles (e.g., “Dr. Hass” or “Professor Hass”)
- Use of professional, courteous standards for all emails and discussions:
 - o Descriptive subject line starting with APK 3220
 - o Address the reader using proper title and name spelling
 - o Body of the email should be concise but have sufficient detail
 - o Give a respectful salutation (e.g., thank you, sincerely, respectfully)
 - o No textspeak (e.g., OMG, WTH, IMO)
- No texting or checking Face Book (or the like) during class/lab instruction time
- No personal conversations unrelated to class material during class instruction time
- Adherence to the UF Student Honor Code:
<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>
 - o Honor code violations of any kind will not be tolerated and sanctions will be determined by the course instructor for first-time violators
 - o Any use, access, or handling of unapproved technology during an exam will result in a zero on the exam and potential failure of the course
 - o All allegations, regardless of the severity, will be reported to the Dean of Students Office for University-level documentation and processing

Course Materials and Copyright Law: The content presented in the class is the property of the instructor and may not be duplicated in any form at without permission from the instructor, and may not be used for any commercial purposes. Students violating this policy may be subject to disciplinary action under the UF Conduct Code. Class lectures are the property of the professor and may not be audio or video taped.

Academic Honesty: 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-honorcode/>) 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 as soon as possible.

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/) 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

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/>.

Additional Resources:

Health and Wellness

- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 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 Learningsupport@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.
- Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <http://www.crc.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 Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaintprocess>

TENTATIVE SCHEDULE..This may very well change

Week of	Topic	Reading
January 8	Introduction: What is Biomechanics?	
January 15	Trigonometry and vector algebra (online)	Appendices A,B,C
	Kinematic Concepts	Ch 2
January 22	Kinetic Concepts	Ch 3
January 29	Human Skeletal Articulations	Ch 4,5
February 5		Exam 1
February 12	Linear Kinematics	Ch 10
February 19	Projectile Motion	Ch 10
February 26	Angular Kinematics	Ch 11
March 12	Lower Extremity	Ch 8
March 19	Lower Extremity	
March 26	Presentations and	Exam 2
April 2	Linear Kinetics and Torques	Ch 12,13
April 9	Angular Kinetics	Ch 14,15
April 16	Fluid Mechanics	Ch 15
April 23	Presentations/ Exam Review	

Exam 3 is May 3: 5:30-7:30 in our classroom.

Exam 1 and 2 dates will be determined by class progress at least one week prior to giving the exam.