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

GRADUATE BIOMECHANICS
ONLINE
APK6226C   ~   3 CREDITS   ~   FALL 2020

INSTRUCTOR:

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Preferred Method of Contact: email

VIRTUAL OFFICE HOURS: Friday 11:30 AM - 12:30 PM EST or by appointment.
Office Hours will be held via Zoom Meetings in Canvas

MEETING TIME/LOCATION:

Content releases week Monday 8:00 AM EST

Content due Wednesday 11:59 EST 1.5 weeks after the release date

COURSE DESCRIPTION:

Applying the principles of statics, kinematics, and kinetics to kinesiological systems of the human body in movement and sports skills.

PREREQUISITE KNOWLEDGE AND SKILLS:

Understanding of Physics 1 concepts and knowledge of musculoskeletal anatomy will be very helpful in this course.

REQUIRED AND RECOMMENDED MATERIALS:

Required Textbook

Robertson, D. G. E., Caldwell, G. E., Hamill, J., Kamen, G., & Whittlesey, S. N. (2014). Research methods in biomechanics. ISBN-13: 978-0736093408 & ISBN-10: 0736093400

Recommended Textbooks

This text is not required but is the text that most underlies the joint modules of this course and is great resource for understanding the mechanical function of joints at a specific anatomical level

Levangie, P. K., Norkin, C. C., & Levangie, P. K. (2011). *Joint structure and function: A comprehensive analysis*. Philadelphia: F.A. Davis Co. ISBN-13: 978-0803658783 & ISBN-10: 0803658788

This text is a great book for understanding gait and its abnormalities. Information from this book shows up in the Gait Kinematics module and is sprinkled throughout the kinetic modules.

Levine, D., Richards, J., Whittle, M., & Whittle, M. (2012). Whittle's gait analysis. Edinburgh: Churchill Livingstone Elsevier. ISBN-13: 978-0702042652 & ISBN-10: 070204265X

Another text on technical methods in performing biomechanical data collections and analyses. David Winter is a notable author for his seminal work in biomechanical methods.

David A. Winter Biomechanics and Motor Control of Human Movement, Fourth Edition, 17 September John Wiley & Sons, Inc. 2009 Print ISBN:9780470398180 |Online ISBN:9780470549148

Provides innovative ways to look at and quantify movement variability. It considers the idea that the structure of variability (the time ordered fluctuations) are as important as the magnitude of variability and contains unique information about the control of movement.

Stergiou, N. (2004). Innovative analyses of human movement. Champaign, IL: Human Kinetics. ISBN-13: 978-0736044677 & ISBN-10: 9780736044677

Introductory Biomechanical Texts that are helpful in conceptualizing content with less dense math compared to the research methods based texts.

Biomechanical Basis of Human Movement by Hammil and Knutzen, ISBN 13: 9781451177305

Basic Biomechanics of the Musculoskeletal System Nordin, M. & Frankel, V.H. (2012). (4th Edition). Baltimore, Maryland. Lippincot Williams & Wilkins. ISBN-13: 978-1609133351

COURSE FORMAT: This course is proctored fully online and asynchronously. Prerecorded video lectures will be posted by Monday mornings 8:00 AM EST. The module quiz for the content will be due Wednesday 1.5 weeks after the release date.

COURSE DESCRIPTION:

Applying the principles of statics, kinematics, and kinetics to kinesiological systems of the human body in movement and sports skills.

COURSE GOALS
1. Collect, quantify, analyze, explain, interpret, and predict kinematic, kinetics and neuromuscular aspects of human motion during gait, exercise, and sports using a biomechanical approach.
2. Explain the of biomechanics of lower body joints especially with respect to gait and sport

CLASS LEARNING ENVIRONMENT

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. Please let me know how you would like to be addressed in class, if your name and pronouns are not reflected by your UF-rostered name. I welcome you to the class and look forward to a rewarding learning adventure together.

You may also change your "Display Name" in Canvas. Canvas uses the "Display Name" as set in myUFL. The Display Name is what you want people to see in the UF Directory, such as "Ally" instead of "Allison."   To update your display name, go to one.ufl.edu, click on the dropdown at the top right, and select "Directory Profile." Click "Edit" on the right of the name panel, uncheck "Use my legal name" under "Display Name," update how you wish your name to be displayed, and click "Submit" at the bottom. This change may take up to 24 hours to appear in Canvas.   This does not change your legal name for official UF records. https://elearning.ufl.edu/student-help-faqs/

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: Course delivery is asynchronous but paced. Missing deadlines for assessments and/or assignments will be considered for make ups on a case by case basis

for extenuating circumstances. Please be prepared to show documentation as evidence for your reason(s) provided.

PERSONAL CONDUCT POLICY: Students are expected to exhibit behaviors that reflect highly upon themselves and our University. 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: 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 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/.

PRIVACY: For online course with recorded materials a statement informing students of privacy related issues such as:
Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image

recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

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/

Evaluation Components (number of each)	Points Per Component
Exams (3)	140 pts each = 420 pts
Quizzes (12)	30 pts each = 360 pts
YellowDig	100 pts each = 100 pts
Lab Assignments (2)	60 pts each = 120 pts
Total	1000

Assessment Proctoring Via Honorlock

Honorlock will proctor your exams this semester. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You DO NOT need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, and a stable Internet connection.

To get started, you will need Google Chrome and to download the Honorlock Chrome Extension. You can download the extension at www.honorlock.com/extension/install

When you are ready to test, log into Canvas, go to your course, and click on your exam. Clicking "Launch Proctoring" will begin the Honorlock authentication process, where you will take a picture of yourself, show your ID, and complete a scan of your room. Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it's on a secondary device.

Good luck! Honorlock support is available 24/7/365. If you encounter any issues, you may contact them by live chat, phone (855-828-4004), and/or email (support@honorlock.com).

Lecture Exams (3) **–** There will be three lecture exams throughout the semester which will not be overtly cumulative (although some concepts build on previous ones). These lecture exams will available during the week they are assign on the schedule. You can take them at the time that works best for your schedule and the will be proctored via Honorlock. The allotted time for these exams will be 2 Hours. The exams will cover class content including both quantitative and conceptual content from recorded lectures and conceptual information from required readings. You will be provided the course formula sheet within the Canvas assessment for the exams. Do NOT print out or open your own from your desktop as this will flag your exam in Honorlock.

Labs (2) – This course includes two virtual lab assignments which analysis of movement data. The first lab will assess kinematics of 2D video recorded exercise movement data. Lab 2 will involve the kinematic and kinetic analysis of 3D motion capture gait data record via a Vicon motion capture system. These lab will be assessed by entry of your outcome in to a Canvas quiz that will parallel the assignment deliverables.

Module/Sub Module Quizzes (12) – There will be 12 module quizzes which will be presented as Canvas quizzes. The constraints on these quizzes will be more relaxed as to take on the quality of a graded homework rather than a high pressure assessment. The quizzes will also draw from lecture and require reading content. These may have quantitative and qualitative components. These are meant to help prepare you for the exams.

Yellowdig Discussion Posting – Yellowdig is a unique online tool aimed at prompting academic discussion in the style of something akin to social media platforms like Facebook. Your engagement with this tool will constitute participation points for the semester. Each week there will be a paper, topic, or prompt to respond to and post about. Your points are earned through original posts, commenting on others' posts, and receiving reactions and comments on your original posts. It's a bit of a game geared at yielding interactive discussion on mutually relevant topics in biomechanics. To be clear points within the Yellowdig platform are not the same as course points and reaching your target points within the Yellowdig platform will constitute reception of full participation points in the Canvas course.

Extra Problem Sets - Some modules will have additional practice problems with solutions available that are not for credit but meant to help prepare you for exams.

Required Reading – Many modules will have required research paper(s) that you are expected to read and discuss via Yellowdig. Content from these paper is also fair game for assessments.

GRADING SCALE:
More detailed information regarding UF's 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	Points Needed to Earn Each Letter Grade	Percent of Total Points Associated with Each Letter Grade	GPA Impact of Each Letter Grade
A	540-600	90.00-100%	4.0
B+	522-539.99	87.00-89.99%	3.33
B	498-521.99	83.00-86.99%	3.0
B	480-497.99	80.00-82.99%	2.67

C+	462-479.99	77.00-79.99%	2.33
C	438-461.99	73.00-76.99%	2.0
C-	420-437.99	70.00-72.99%	1.67
D+	402-421.99	67.00-69.99%	1.33
D	360-401.99	60.00-66.99%	1.0
E	≤ 359.99	0-59.99%	0

This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. However the professor reserves the right to modify, supplement and make changes as the course needs arise. This includes exam dates and lecture topics that may change depending on class progress.

WEEKLY COURSE SCHEDULE:

Week	Dates	Topics
0	Aug 20 - 23	No Class – COVID Delay
1	Aug 31 - Sept 4	Getting Started Fundamental Concepts and Tools M1.1
2	Sept 7 - Sept 11	Fundamental Concepts and Tools M1.2
3	Sept 14 - 18	Planar Kinematics M 2.1
4	Sept 21 - 25	Planar Kinematics M 2.2 **Lab 1: 2D Video Movement Analysis**
5	Sept 28 - Oct 2	3D Kinematics
6	Oct 5 - 9	**Exam 1 (M1-M3)**
7	Oct 12 - 16	Hip Complex Biomechanics
8	Oct 19 -23	Knee Joint Biomechanics
9	Oct 26 - 30	Ankle and Foot Complex Biomechanics
10	Nov 2 - 6	Kinematics of Gait
11	Nov 9 - 13	Forces Impulse and Momentum
12	Nov 16 - 20	**Exam 2 (M4-M7)** **Lab 2: 3D MoCap Gait Analysis**
13	Nov 23 - 27	Inverse Dynamics *Thanksgiving Break … Wed-Friday*
14	Nov 30 - Dec 4	Work, Energy and Power
15	Dec 7 - 11	Review/Special Topic *Thursday and Friday Reading Days*
16	Dec 14 - 18	**Exam 3 (M8-M10)**