INTRODUCTION TO

Biomechanics

KIN 216 (3) | Fall 2023

Welcome to the Biomechanics course! My name is Dr. **Paul** Kennedy and it is my pleasure to work with you this term. This is an introductory course in biomechanics. Some that have taken physics recently will find that concepts are reviewed throughout. Others that haven't taken those courses may be overwhelmed at the thought of taking a course about the principles of mechanics. It doesn't matter what your background is coming into this course. My job, as the instructor, is to provide every student with the foundational knowledge necessary to understand the application of mechanics.

 paul.kennedy@ubc.ca  604-822-9204  War Memorial Gym 218  By appointment

Land Acknowledgment

I would like to begin by acknowledging that the land on which we gather is the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musqueam) People.

Let's take a moment to appreciate the meaning behind the words we use: *traditional* recognizes lands traditionally used and/or occupied by the Musqueam people or other First Nations in other parts of the country; *ancestral* recognizes land that is handed down from generation to generation; *unceded* refers to land that was not turned over to the Crown (government) by a treaty or other agreement.

As you continue your journey at UBC, take some time to learn about the history of this land and to honour its original inhabitants. Start here: https://indigenous.ubc.ca/indigenous-engagement/musqueam-and-ubc/

Inclusivity Statement

Education is a multidisciplinary field that brings together faculty, students and others from diverse academic and personal backgrounds. The School of Kinesiology is committed to creating a respectful workplace and learning environment that supports inclusion based on the principles of equity, diversity and social justice in order to create an environment that supports its community members' full participation.

The School of Kinesiology is committed to providing accessible, usable, and welcoming spaces for faculty, staff, students, and visitors who have disabilities, are members of racialized communities, Indigenous, transgender, two-spirit and gender-diverse people, regardless of their age, sexual orientation, social status, religion, ethno-linguistic, nationality and/or citizenship status.

Kinesiology courses take place in learning environments that are inclusive of gender identity, gender expression, sex, race, ethnicity, class, sexual orientation, ability, age, etc. Learners and educators expect to be treated respectfully at all times and in all interactions. Non-sexist, non-racist, non-homophobic, non-transphobic and non-heterosexist language is expected in Kinesiology classes, course content, discussions and assignments.

Please feel welcome to e-mail me your name and pronoun and how you would like these to be used.

LEARNING OBJECTIVES

By the end of this course, students will be able to:

- Identify the goals of sport biomechanics and the common tools used to achieve these goals
- Distinguish between linear, angular, and general forms of motion
- Describe the relationships among kinematic and kinetic variables
- **Understand and apply the steps of quantitative reasoning**
- Solve quantitative problems involving kinematic and kinetic quantities and the relationships between linear and angular variables
- Identify Newton's Laws of Motion and describe practical examples of the Laws
- Explain how forces create and affect movement
- List the steps involved in both qualitative and quantitative biomechanics analysis of human movement

STUDY TIPS…..

And other helpful suggestions

Make a Study Plan

Schedule so many hours per day or week to keep on top of your coursework. Create goals that are clear and reasonable (achievable).

Manage Your Time

Make time for schooling. Estimate how much time you need for studying, working on assignments. But, make sure to set aside some time to unwind.

Work with Others

Find a study buddy. Join a study group. Share notes, work on problems together, or create your own tests. Working with others can make learning more enjoyable (and help address any questions you might have).

Be an Active Learner

Put your phone away and focus on what is being discussed. Take notes. Try to apply what you learn in the classroom, to something outside the classroom.

COMMUNICATION

When in doubt……ask!!!

EMAIL

Questions through email are welcome. I check my email regularly during the week. I will do my best to respond within 24 hours (but not on weekends). Please include your first and last name and course code (KIN 216) in the subject line. Thanks!

MEETINGS

Some questions may have to be discussed in a one-on-one meeting. Setting up a time to meet is also a great way to get to know your instructor. Just send me an email and we can always arrange a time to chat that works for both of us.

WEBSITE

Announcements, handouts, and other materials are regularly posted on your course website. Please make sure that you are checking the Canvas site regularly and keeping up with the material.

CLASS EXPECTATIONS

Summary of some of the key expectations for this course:

DOWNLOAD

Go to the course website and gather the materials you will need for each lecture. Read ahead, complete any tasks so that you are ready for class.

ATTEND

It is important to come to class regularly. Class meetings give you another perspective on the material and you can ask questions.

PARTICIPATE

A course is much more rewarding if you fully participate. Get involved in the learning process and participate in activities and discussions.

RESPECT

Everyone must be treated with respect. Please be mindful of your interactions with others, whether meetings in-person or through online chats or email exchanges.

FOCUS

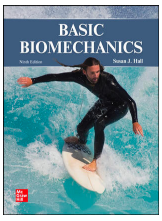
Avoid using electronic devices for anything other than taking notes, or following the lecture. If you need to use your phone, please step outside and return shortly (if it can't wait).

CHECK IN

You are responsible for all material covered in class and any information given whether in attendance or not. Contact me if you lose track of what's been covered.

READINGS…..

and other useful resources



Basic Biomechanics, 9th Edition
Susan Hall

Publisher
McGraw Hill

http://canvas.ubc.ca
Find helpful handouts and other classroom materials

http://www.library.ubc.ca
Find texts and other materials dealing with biomechanics at the Library

COURSE FORMAT

Here is what to expect (look forward to) this term

- Term will be broken down into 5 units. A quiz will be held at the end of the first 4 units.
- Students will be put into small groups (which will provide you with a support system). Quizzes will be completed in groups.
- It is important to be prepared for these activities. Please make sure that you are reviewing relevant chapter(s).
- When questions come up……ASK!
- On-line lectures (videos) will be available to view at your discretion. Opportunity to review course topics and concepts.

ASSESSMENTS

Your final grade will be determined based on your marks from the following assessments. **There are NO OPPORTUNITIES TO EARN EXTRA CREDITS**. So, please pay attention to the dates and deadlines so that you are prepared to complete the following. And if something arises, please talk me as soon as possible.

Quizzes	20%	See Schedule
Test 1: Linear Motion	20%	Thursday, October 19
Test 2: Angular Motion	20%	Thursday, November 23
Peer Evaluation	5%	Thursday, December 7
Final Exam (Comprehensive)	35%	Written during the December Exam Period

It's important that you're planning ahead, organizing your time, and being proactive with your assessments. **I am notable to help you because of poor planning**. The two tests will not be rescheduled for any reason other than a medical issue or family emergency. Quizzes unfortunately cannot be rescheduled. Please speak with me to transfer the weight of the quiz to the final exam. If you do not contact me, you will be given a score of zero on the evaluation.

Calculating Your Grade

Questions about grades or details about scores on evaluations will not be provided through email. So, please use this form to track your progress throughout the semester.

	Mark		***Total***		***%***		***Weight***		***Mark***
Q1	_____	÷	_____	=	_____	x	2.5	=	_____
Q1	_____	÷	_____	=	_____	x	2.5	=	_____
Q2	_____	÷	_____	=	_____	x	2.5	=	_____
Q2	_____	÷	_____	=	_____	x	2.5	=	_____
Test 1	_____	÷	_____	=	_____	x	20	=	_____
Q3	_____	÷	_____	=	_____	x	2.5	=	_____
Q3	_____	÷	_____	=	_____	x	2.5	=	_____
Q4	_____	÷	_____	=	_____	x	2.5	=	_____
Q4	_____	÷	_____	=	_____	x	2.5	=	_____
Test 2	_____	÷	_____	=	_____	x	20	=	_____
Peer	_____	÷	_____	=	_____	x	5	=	_____

Add up the marks to determine your term mark

	Final Mark		***Term Mark***		***Exam Mark***
Calculate your exam mark using the term mark	_____	-	_____	=	_____

SCHEDULE

Topics and assigned readings for each class are listed below, although, this may be subject to change. If you have questions about what was covered in class, please don't hesitate to contact me.

	Date		*Topic*	*Readings*
Th	Sept	7	Course Overview	—
T	Sept	12	Introduction to Biomechanics	1
Th	Sept	14	Defining Force	3, 13
T	Sept	19	Describing Linear Movements	2, 10
Th	Sept	21	Projectile Motion	2, 10
T	Sept	26	Quantitative Reasoning	1, 2, 10
Th	**Sept**	**28**	**Linear Kinematics Quiz**	**Quiz on Chapters 2, 10**
T	Oct	3	Momentum and Impulses	3, 12
Th	Oct	5	Free Body Diagrams	3, 12
T	Oct	10	Work, Power, Energy	3, 12
~~Th~~	~~Oct~~	~~12~~	~~Make-Up Monday~~	~~No Class~~
T	**Oct**	**17**	**Linear Kinetics Quiz**	**Quiz on Chapters 3, 12**
Th	**Oct**	**19**	**Test 1: Linear Motion**	**Test on Chapters 1, 2, 3, 10, 12**
T	Oct	24	Defining Torque	3, 13
Th	Oct	26	Describing Angular Motion	2, 11
T	Oct	31	General Motion	2, 11
Th	**Nov**	**2**	**Angular Kinematics Quiz**	**Quiz on Chapters 2, 11**
T	Nov	7	Revisting Newton's Laws	3, 13, 14
Th	Nov	9	Balance and Stability	3, 13, 14
~~T~~	~~Nov~~	~~14~~	~~Midterm Break~~	~~No Class~~
Th	Nov	16	Angular Kinetic Problems	3, 13, 14
T	**Nov**	**21**	**Angular Kinetics Quiz**	**Quiz on Chapters 3, 13, 14**
Th	**Nov**	**23**	**Test 2: Angular Motion**	**Test on Chapters 2, 3, 11, 13, 14**
T	Nov	28	Quantitative Analysis	1, 2
Th	Nov	30	Biomechanics of the Body	3, 4, 6
T	Dec	5	Electromyography	3
Th	Dec	7	Biomechanical Applications	—
December Exam Period			**Final Exam (Cumulative)**	**Test on all notes and readings**

UNIVERSITY POLICIES

Academic Honesty and Standards

Academic honesty is essential to the continued functioning of the University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action.

It is the student's obligation to inform himself or herself of the applicable standards for academic honesty. Students must be aware that standards at the University of British Columbia may be different from those in secondary schools or at other institutions. If a student is in any doubt as to the standard of academic honesty in a particular course or assignment, then the student must consult with the instructor as soon as possible, and in no case should a student submit an assignment if the student is not clear on the relevant standard of academic honesty.

If an allegation is made against a student, the Registrar may place the student on academic hold until the President has made his or her final decision. When a student is placed on academic hold, the student is blocked from all activity in the Student Service Centre.

Resources to Support Student Success

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on the UBC Senate website.

Academic Accommodation for Students with Disabilities or Ongoing Medical Conditions

The University of British Columbia recognizes its moral and legal duty to provide academic accommodation. The University must remove barriers and provide opportunities to students with a disability, enabling them to access university services, programs, and facilities and to be welcomed as participating members of the University community. The University's goal is to ensure fair and consistent treatment of all students, including students with a disability, in accordance with their distinct needs and in a manner consistent with academic principles.

Students with a disability who wish to have an academic accommodation should contact Centre for Accessibility without delay.

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