HPHY 381 Biomechanics – Fall 2014

University of Oregon, Department of Human Physiology

Instructor

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Office Hours: Tuesday, 3:30-4:30; Wednesday, 10:00-12:00

GTF's

JJ Hannigan	346-1033	B52 Gerlinger Annex	hannigan@uoregon.edu
Bryson Nakamura	346-4114	Bowerman Building	bnakamur@uoregon.edu
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Amy Lo	346-1033	B52 Gerlinger Annex	onyee@uoregon.edu

Prerequisites HPHY 322, 323, PHYS 201

Meeting TR, 2-3:20 pm, 240C McKenzie Hall

Textbook Biomechanics of Sport and Exercise, 3rd Edition, Peter McGinnis

Course Description This course provides an introduction to the principles of biomechanics, emphasizing the contribution of biomechanics to understanding function and dysfunction of the musculoskeletal system.

Course Objectives

Upon successful completion of this course, each student should be able to:

1) Use precise, well-defined terminology to describe motion.
2) Quantify linear and angular descriptors of human motion (kinematics).
3) Quantify the forces associated with human movement (kinetics).
4) Use Newton's laws to study forces and torques applied to the human body.
5) Describe the relationship between linear and angular characteristics of motion.
6) Work together in a group to develop and test a biomechanical hypothesis.
7) Share the results of a research project as if you were taking part in a national conference.

Blackboard We will be making extensive use of this on-line system at blackboard.uoregon.edu. Please check often for class updates.

Course Readings You are responsible for the assigned readings from the text and any other materials that may be assigned. It is suggested that you come to class having already read the assigned reading as this will make the class more informative for you. Several copies of the class textbook are on reserve at the Science Library.

Attendance Policy Consistent attendance reflects professional behavior and it is expected that students attend class on a regular basis. In the event of an emergency or illness, students should notify the Course Director. Students are responsible for all missed course content and assignments.

Grading Criteria

Exams (50%) There will be two mid-term exams (15% each) and a comprehensive final exam (20%).

Laboratory Reports (20%) Weekly lab reports (n=5) are to be handed in at the following week's lab section. There will be a reduction of 20% in that assignment's grade for each day that it is late. You are to miss attendance of one lab, but you are still expected to get the data from one of your lab partners and hand in the assignment on time. If you miss a second lab, you will not receive credit for that lab.

Group Project (20%) Similar to HPHY 371, you will be working on a group project involving the techniques you have learned about during the first 6 labs of class. Groups of 3-4 will be assigned during the first week of labs. Your groups will develop a research project for which you can make measurements with equipment available to you in the biomechanics lab. Your group needs to generate a specific question and hypothesis that you will answer using your methodology. Using your data, your group will then need to interpret the data and draw conclusions based on your data. More details will be provided, but here are the expectations for the project:

Group Contract *(due in lab of week 2)* – **5%**
Initial Proposal *(due in lab of week 3)* – **5%**
Literature Review *(due in lab of week 4)* – **5%**
Proposed Methods *(due in lab of week 5)* – **5%**
Abstract *(due 11/26 by 5pm on Blackboard)* – **40%**
Oral Presentation *(given in lab of week 10)* – **40%**

Homework (10%) There will be regular homework assignments to help students assess their own progress. Full credit will be given for turning in a "good faith effort" on Blackboard.

The course will be graded on the following scale

A+ = 98 – 100%	A = 92 – 97.9%	A– = 90 – 91.9%
B+ = 88 – 89.9%	B = 82 – 87.9%	B– = 80 – 81.9%
C+ = 78 – 79.9%	C = 72 – 77.9%	C– = 70 – 71.9%
D = 60 – 69.9%		
F = Below 60%		

Students with Disabilities The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability related barriers to your participation. You are also encouraged to contact the Accessible Education Center (formerly Disability Services) in 164 Oregon Hall at 346-1155 or uoaec@uoregon.edu.

Academic Misconduct The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at: http://library.uoregon.edu/guides/plagiarism/students/index.html.

Respect for Diversity
The University of Oregon affirms and actively promotes the right of all individuals to equal opportunity in education and employment at this institution without regard to race, color, sex, national origin, age, religion, marital status, disability, veteran status, sexual orientation or any other extraneous consideration not directly and substantively related to effective performance.

Tentative Course Outline

Week	Date	Topic	Suggested Reading	HW	Lab
1	Sep 30	Introduction	Introduction		Introduction
	Oct 2	Linear Kinematics	Chapter 2	HW1	
2	Oct 7	Angular Kinematics	Chapter 6		2D Kinematics
	Oct 9	Forces	Chapter 1 (20-39)	HW2	
3	Oct 14	Torques	Chapter 5 (133-141)		3D Kinematics
	Oct 16	Static Equilibrium	Chapter 1 (39-44) Chapter 3 (87-91) Chapter 5 (141-145)	HW3	
4	Oct 21	Static Equilibrium			EMG
	Oct 23	***Midterm Exam 1***			
5	Oct 28	Skeletal Muscle	Chapter 11		Kinetics
	Oct 30	Linear Kinetics	Chapter 3	HW4	
6	Nov 4	Shoulder			Biodex
	Nov 6	Angular Kinetics	Chapter 7		
7	Nov 11	Work, Energy and Power	Chapter 4	HW5	Project
	Nov 13	Guest Lecture			
8	Nov 18	***Midterm Exam 2***			Project
	Nov 20	COM		HW6	
9	Nov 25	Guest Lecture			Project (open labs)
	Nov 27	*Thanksgiving*			
10	Dec 2	Projects			Presentations
	Dec 4	Pedal Power			
11	Dec 10	***Final Exam at 12:30***			