HPHY 381 Biomechanics – Winter 2007

University of Oregon, Department of Human Physiology

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Prerequisites: HPHY 313; MATH 112; PHYS 201; ANAT 311

Meeting: MWF, 12-12:50 pm, 110 Fenton

Textbook: Biomechanics of Sport and Exercise, 2nd Edition, Peter McGinnis

Course Description: This course provides an introduction to the principles of biomechanics, emphasizing the contribution of biomechanics to understanding human movement, and develops an of mechanical and anatomical concepts related to human performance.

Course Objectives: Upon completion of this course, each student should be able to:
1) Use precise, well-defined terminology to describe motion.
2) Understand how to use Newton's laws to study forces and torques
3) Analyze the mechanical properties of biological tissues
4) Understand and quantify linear and angular descriptors of human motion (kinematics).
5) Understand the relationship between linear and angular characteristics of motion.
6) Understand and quantify the basic causes of human movement (kinetics).
7) Understand the basic biomechanical factors involved in human movements.

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 lectures more informative for you.

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:

Laboratories **30%**
Homework/Quizzes **20%**
Midterm Exam **20%**
Final Exam **30%**

Course grade will be on the following scale:

A+/A/A-	90-100%
B+/B/B-	80-89%
C+/C/C-	70-79%
D	60-69%
F	<60%

Weekly Course Outline

OVERVIEW AND MATHEMATICAL REVIEW

Week 1: Jan 8-12
Introduction
McGinnis: Introduction

STATICS

Force, moment and position vectors
McGinnis: Chapter 1 (20-39), Chapter 5 (118-126)

Week 2: Jan 15-19
Jan 15th – Martin Luther King Jr. Day - NO CLASS HELD
Force, moment and position vectors (continued)
Newton's 1st Law, static equilibrium, free body diagrams, center of gravity
McGinnis: Chapter 1 (39-44), Chapter 3 (78-81), Chapter 5 (126-144)

Week 3: Jan 22-26
Newton's 1st Law continued
McGinnis: Chapter 1 (39-44), Chapter 3 (78-81), Chapter 5 (126-144)

Week 4: Jan 29 – Feb 2
Elastic and plastic material properties
McGinnis: Chapter 9 (214-230)

DEFORMABLE BODY MECHANICS

Week 5: Feb 5-9
Material properties of biological tissues
McGinnis: Chapter 9 (230-235)
Feb 9th – Midterm Exam

Week 6: Feb 12-16
Neuromuscular System
McGinnis: Chapters 11 and 12

DYNAMICS

Week 7: Feb 19-23
Linear Kinematcs
McGinnis: Chapter 2

Week 8: Feb 26 – March 2
Angular Kinematics
McGinnis: Chapter 6

Week 9: March 5-9
Linear Kinetics
McGinnis: Chapters 3 and 4

Week 10: March 12-16
Angular Kinetics
McGinnis: Chapter 7