GEORGE MASON UNIVERSITY
School of Recreation, Health, and Tourism

KINES 400—Biomechanics (3)
Fall 2012

DAY/TIME:	M 7:20 – 10:00 p.m.	LOCATION:	PW – 249 Bull Run Hall
PROFESSOR:	Dr. Joel Martin	EMAIL ADDRESS:	jmarti38@gmu.edu
OFFICE LOCATION:	210 Bull Run Hall	PHONE NUMBER:	703-993-7607
OFFICE HOURS:	W 10:00 – Noon Or by appointment	FAX NUMBER:	703-993-2025

PREREQUISITES
Successful completion of BIOL 124 & 125, and KINE 300 (formerly KINE 300).

COURSE CATALOG DESCRIPTION
Biomechanics is the application of mechanical principles to biological systems. This includes both the analysis of human movement and the functional dynamics of tissue such as muscle or bone. This course will focus on kinetic and kinematic concepts and how they apply to the quantitative assessment of human movement.

COURSE OBJECTIVES
The course will introduce students to the basic concepts and analysis techniques used in biomechanics with a focus on the analysis of human movement. At the completion of this course students should be able to:

1) Describe and define movements and fundamental biomechanical principles using scientific terminology.
2) Define, recognize, and apply concepts of both linear and angular kinematics and kinetics as they apply to the analysis of human movement.
3) Recognize the equipment and techniques used for the quantitative assessment of human movement.
4) Apply biomechanical principles to human movement situations including but not limited to performance, training, rehabilitation, and injury prevention.
5) Evaluate the mechanics of exercises and activities as they affect the human body.
6) Apply principles related to internal tissue loading to improving tissue structure and function, and to injury prevention.

SPECIAL REQUIREMENTS
This course requires a laboratory fee of $25.00 payable to George Mason University. This fee is due at the beginning of the second class meeting (September 10, 2011) and you need to pay with a check. You should make your check payable to George Mason University and in the Memo section write in "KINE 400 Lab Fee." A receipt will be issued to you upon payment.

COURSE OVERVIEW
Attendance and Participation
Attendance is **required** for this class. Arriving to class late or leaving early will be count as an absence. Students are expected to show up prepared to class and participate during class activities. Students who know they will need to miss a class for a legitimate reason should contact the instructor before the class. Students who unexpectedly miss a class for an excused reason should contact the instructor within 24 hours of missing the class. Make-up tests, quizzes, assignments, or other grades will be granted for excused absences only. Excused absences include: serious illness, official university excused absences and extenuating circumstances. It is the student's responsibility to contact the instructor in order to obtain the make-up work.

Academic Load
In addition to attending the lectures there will be regular homework assignments and projects that may require anywhere from 2-10 hours of work per week. Additionally, regular readings will be assigned to students. Students are expected to complete all outside work on time. Extensions will not be granted on assignments unless an extenuating circumstance arises. The purpose of the assignments is to aid students in learning the material. ***Students who attend class, complete all assignments on time, and attend office hours when necessary will be better prepared for the exams than students who do not do so.***

Honor Code
Students are held to the standards of the George Mason University Honor Code (see http://honorcode.gmu.edu for details). Violations, including cheating and plagiarism, will be reported to the Honor Committee. Student assignments may be put through plagiarism detecting software.

Written Assignments
All assignments must be typed. Pay close attention to spelling and grammar as these will count towards your grade on written assignments. American Medical Association Manual (AMA) of Style (10th edition) format must be used for all written work in this class (e.g., in referencing, creation of tables, and formatting headers for paper sections). **Assignments must be turned in on Blackboard/MyMason Portal by the beginning of class on the specified date due. No late assignments will be accepted.** It is recommended that students keep copies of all submitted work.

Class Material
I use a combination of approaches to assist your learning. These include reading assignments and discussion of the reading, learning activities that provide practical experience in research methods, analyzing research examples, and homework preparing various elements of a research proposal. You are encouraged to ask questions about the assigned reading, followed by discussion and learning activities. This means you must read the material before the class! Be prepared to be called on at random regarding the readings

Class Delivery
The course is primarily a lecture course. However, other approaches may be used to facilitate learning. These include: class discussions, videos, demonstrations and in-class activities.

Technology Use During Class
As per GMU policy, all sound emitting technology is required to be turned off during the class meeting time. No sound emitting technology (e.g., cell phones, smart phones, iPads, Tablets, pagers, etc.) is allowed at any time during the class period. Students who are observed using any form of technology inappropriately (e.g., sending text messages from cell phones, visiting social networking sites from laptops, etc) will be dismissed from class for the day, counted as an absence, and not permitted to make up missed assignments.

Email Correspondence
The preferred method of communication outside of class is email. Emails should originate from a George Mason email account and be in a professional format (i.e. emails should not look like a text message!). The following is an example:

Dr. Martin,

I have a question regarding….

Regards,
Student Name

ACADEMIC INTEGRITY:
GMU is an Honor Code University; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated

gravely. What does academic integrity mean in this course? First, it means that when you are responsible for a task, you will be the one to perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives and traditions. When in doubt, please ask for guidance and clarification.

Required Textbooks:
Hamill & Knutzen. Biomechanical basis of human movement. 3rd Edition, Lippincott Williams & Wilkins (2008)

Supplementary materials:
Supplementary materials will be used in class and posted on BlackBoard/MyMason Portal. Please print these materials and bring them to class so that you have access to them when needed.

EVALUATION
Students will be evaluated on content standards (knowledge gained) and performance (demonstration of the content). Content standards will be assessed via exams and laboratory assignments. Performance will be assessed through completion of class activities.

This course will be graded on a point system, with a total of 100 possible points.

Assignments		**Points**
#1	Exam I	15
#2	Exam II	15
#3	Final Exam	20
#4	Research Project Proposal	25
#5	Activity Labs	10
#6	Attendance	5
#7	Research Project Presentation	10
TOTAL		100

Grading Scale

A = 94 – 100	B+ = 88 – 89	C+ = 78 – 79	D = 60 – 69
A- = 90 – 93	B = 84 – 87	C = 74 – 77	F = 0 – 59
	B- = 80 – 83	C- = 70 – 73	

Exams and Final Exam:
Each student will be required to complete two exams and a final exam. The final exam will be cumulative. The format for all exams will be multiple choice, true/false, short essays, and problem-solving questions. Examinations represent inquiries regarding student knowledge of fact regarding course content. Examinations demonstrate that the student can remember and apply facts as well as demonstrate a hierarchy of knowledge information.

Research Project Proposal:
These research projects provide experience in developing a movement analysis research project with application of biomechanical concepts, and allow for interaction within a working group environment. Demonstration of communication (oral and written) skills is important in the development of the professional student. The research

project will be developed in small groups (2-3 maximum) – individual aspects of the project can be divided amongst individuals. Research Project proposal format will be distributed on blackboard.

Research Project Presentation:
The intent of this assignment is for you to share your research project proposal with your colleagues via a 10-minute PowerPoint presentation. This assignment will allow you to gain experience in oral presentation skills. As part of the experience, your colleagues & I may ask questions about your study, and I will offer a summary critique intended to help you improve your final written proposal.

Activity Labs:
The intent of these activities is to show how the theory learned in class can be applied to a variety of common activities. These will require students to assemble in small groups. One student will perform a movement and the other students will observe. Everyone should take turns performing the movement. In some instances videos of a movement may be provided to students. The instructor will provide each student with questions to be answered about what they observed. One lab per group will be handed in, with the names of all group members on the lab, and all group members will receive the same grade. The completed lab must be handed in at the start of the next class.

EXAM REVIEWS:
As time allows in class and depending on class progress in each unit, a review *may* be offered before each exam. At that time, students can ask any content question that they would like. Students are not required to participate in the review, and can participate or leave as they choose. If there are no questions related to the content of the unit, the review session will be ended. Whether or not a review is conducted in class depends of class progress through the material for each unit *and* class participation in previous reviews. If there is no time to have a formal review or, if review sessions are not being utilized, students will need to come to office hours to address any questions on class material.

TENTATIVE COURSE SCHEDULE
Note: 1. There is no class on Labor Day – September 3rd.
2. The class on October 9th is a Tuesday.

Date	Topic	Chapter/Assignment Due Date
Aug 27M	Introduction to KINE 400 Introduction to course What's worth knowing? Questions and Answers	
Aug 27M	Why study biomechanics Difference between Kinesiology & Biomechanics Instrumentation used in Biomechanics	
Sept 10 M	Basic Terminology	Chapter 1
Sept 10M	Skeletal Considerations for Movement ***Activity Lab #1***	Chapter 2
Sept 17 M	Overview of Functional Anatomy	Chapter 5, 6, & 7
Sept 17 M	Linear Kinematics ***Activity Lab #2***	Chapter 8
Sept 24 M	Linear Kinematics	Chapter 8

Sept 24 M	Linear Kinematics / Kinematic Data Collection (Observation, 2D, 3D) – *Pending Laboratory availability (Article Review)*	Chapter 8
Oct 1 M	Angular Kinematics	Chapter 9
Oct 1 M	Angular Kinematics	Chapter 9
Oct 9 T	Angular Kinematics *Exam Review*	Chapter 9
Oct 9 T	**EXAM I**	
Oct 15 T	Linear Kinetics	Chapter 10
Oct 15T	Linear Kinetics ***Activity Lab #3***	Chapter 10
Oct 22 M	Linear Kinetics / Angular Kinetics	Chapter 10 & 11
Oct 22M	Angular Kinetics / Kinetic Data Collection (Force Plates) – *Pending Laboratory availability (Article Review)*	Chapter 11
Oct 29 M	Angular Kinetics	Chapter 11
Oct 29 M	***Activity Lab #4*** *Exam Review*	Chapter 11
Nov 5 M	**EXAM II**	
Nov 5 M	Force Plates - *Pending Laboratory availability*	
Nov 12 M	EMG Data Collection – *Pending Laboratory availability*	
Nov 12 M	Electromyography (EMG) - *Pending Laboratory availability*	
Nov 19 M	Isometric Strength	
Nov 19 M	Pressure Analysis **Research Project Proposal Due** **Research Project Presentations Due**	
Nov 26 M	VICON + EMG - *Pending Laboratory availability*	
Nov 26 M	***In-Class Workday for Research Projects***	
Dec 3 /m	Presentations	
Dec 3 M	Review for Final	
Dec 17 M	**Final Exam: 7:30 – 10:15PM**	

Note: **The instructor reserves the right to make changes to the course syllabus and/or schedule at any time. Students will always be informed of any changes made.**

Note: Faculty reserves the right to alter the schedule as necessary.

Final Grades:
Once your FINAL GRADE at the end of the semester is posted on mymasonportal/blackboard, you will have 24 hours to inquire about it. After that period, your grade will be posted as final.

Student Expectations

- Students must adhere to the guidelines of the George Mason University Honor Code [See http://academicintegrity.gmu.edu/honorcode/].
- Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu/].
- Students must follow the university policy for Responsible Use of Computing [See http://universitypolicy.gmu.edu/1301gen.html].
- Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
- Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.
- Students are expected to exhibit professional behaviors and dispositions at all times.

Campus Resources

- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu/].
- The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing [See http://writingcenter.gmu.edu/].
- For additional information on the College of Education and Human Development, School of Recreation, Health, and Tourism, please visit our website [See http://rht.gmu.edu].

CORE VALUES COMMITMENT: The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles.

MASON
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