

GEORGE MASON UNIVERSITY  
School of Recreation, Health and Tourism

KINE 400-001 — Biomechanics (3)  
Fall 2013

DAY/TIME:	TR 12:00 p.m. –1:15 p.m	LOCATION:	Bull Run 148/SMART LAB
PROFESSOR:	Dr. Nelson Cortes	EMAIL ADDRESS:	<a href="mailto:ncortes@gmu.edu">ncortes@gmu.edu</a>
OFFICE LOCATION:	Bull Run Hall 208B	PHONE NUMBER:	703-993-9257
OFFICE HOURS:	T: 10:30 – 11:30 a.m. or by appointment	FAX NUMBER:	703-993-2025
Dept. Website	<a href="http://rht.gmu.edu">rht.gmu.edu</a>	Class Website:	<a href="http://mymasonportal.gmu.edu">mymasonportal.gmu.edu</a>

PREREQUISITES:

BIOL 124, BIOL 125, ATEP 300, KINE 360

COURSE CATALOG DESCRIPTION:

Focuses on kinetic and kinematic concepts and how they apply to the quantitative assessment of human movement. Analyzes human movement and the functional dynamics of tissue such as muscle or bone.

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 (**August 29, 2013**) 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.

### **E-mail Correspondence**

Only messages that originate from a George Mason University email address will be accepted. The following is an appropriate professional format:

Dear Dr. Cortes (*Beginning salutation*)

I have a question regarding one of the assignments. (*Text body*)

Regards, (*Ending Salutation*)

“John Doe” (*Your name*)

### **NATURE OF COURSE DELIVERY**

This course is delivered through classroom instruction (face to face), and online assignments.

### **REQUIRED READINGS**

Hamill & Knutzen. Biomechanical basis of human movement. 3<sup>rd</sup> 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. 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 on Patriot Web.

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

<b>Assignments</b>	<b>Points</b>
#1 Exam I	15
#2 Exam II	15
#3 Final Exam	25
#4 Independent Study Paper	10
#5 Lab Reports	25
#6 Independent Study Presentation	10
<b>TOTAL</b>	<b>100</b>

### **Course Grading Scale:**

The student's final letter grade will be earned based on the following scale:

#### **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.

**Independent Study Paper:**

Students will be required to independently study and write a short review paper on a specific topic. The purpose of this assignment is to allow students to explore a topic they are interested in related to the field of biomechanics but is not covered in depth in the class. The paper must be between 3-5 pages long. A list of topics will be made available on Blackboard. Students must choose a topic from the list and cannot do the same topic as another member of the class. Topics will be approved on a first come first serve basis. **The topic needs to be chosen by September 31, 2013**

**Independent Study Presentation:**

Each student will give a brief presentation on the respective independent study paper. The intent of the presentation is to teach the other members of the class about the topic you chose. The presentations must be no longer than 5 minutes.

**Labs and Lab Reports:**

The intent of the laboratories is to show how the theory learned in class can be applied to a variety of common activities. The labs will require students to work in small groups. During the lab sessions data will be collected and a simple analysis will be performed. The labs will include questions regarding the results and several discussion questions. Each group must hand in 1 formal lab report, which will be due in class exactly 1 week after the lab is performed. Lab reports must be typed and include a cover sheet. Calculations may be hand written. There will be 8 lab reports in total with each carrying the same weight towards the overall grade. The math review lab report will NOT count for your grade.

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**

<b>Date</b>	<b>Topic</b>	<b>Chapter/Assignment Due Date</b>
Aug 27 <sup>T</sup>	Introduction to KINE 400 Introduction to course and labs What's worth knowing? Questions and Answers	
Aug 29 <sup>TR</sup>	Why study biomechanics Difference between Kinesiology & Biomechanics Instrumentation used in Biomechanics	<b>Lab fee is due</b>
Sept 3 <sup>T</sup>	Basic Terminology / Skeletal Considerations for Movement / Overview of Functional Anatomy	Chapter 1 / Chapter 2 / Chapter 5, 6, & 7
Sept 5 <sup>TR</sup>	Activity Lab #1 – Math Review	
Sept 10 <sup>T</sup>	Linear Kinematics	Chapter 8 <b>Lab report #1 is due</b>
Sept 12 <sup>TR</sup>	Activity Lab #2 – Biomaterials	
Sept 17 <sup>T</sup>	Linear Kinematics	Chapter 8 <b>Lab report #2 is due</b>
Sept 19 <sup>TR</sup>	Activity Lab #3 – Linear Kinematics	
Sept 24 <sup>T</sup>	Angular Kinematics	Chapter 9 <b>Lab report #3 is due</b>
Sept 26 <sup>TR</sup>	Activity Lab #4 – Projectile Motion	
Oct 1 <sup>T</sup>	Angular Kinematics	Chapter 9 <b>Lab report #4 is due</b>
Oct 3 <sup>TR</sup>	<b>EXAM I</b>	
Oct 8 <sup>T</sup>	Linear Kinetics	Chapter 10
Oct 10 <sup>TR</sup>	Linear Kinetics	Chapter 10
Oct 15 <sup>T</sup>	<b>No Class – Columbus Day Recess</b>	
Oct 17 <sup>TR</sup>	Activity Lab #5 – Moment of Inertia	
Oct 22 <sup>T</sup>	Angular Kinetics	Chapter 11 <b>Lab report #5 is due</b>
Oct 24 <sup>TR</sup>	Activity Lab #6 – Angular Momentum	
Oct 29 <sup>T</sup>	Angular Kinetics	Chapter 11 <b>Lab report #6 is due</b>
Oct 31 <sup>TR</sup>	Activity Lab #7 – Center of Mass/Anthropometry	
Nov 5 <sup>T</sup>	<b>EXAM II</b>	<b>Lab report #7 is due</b>

Nov 7 <sup>TR</sup>	Instrumentation Lecture	
Nov 12 <sup>T</sup>	<b><i>In-Class Workday for Research Projects</i></b>	
Nov 14 <sup>TR</sup>	Activity Lab #8 – Segmental Inertia Properties	
Nov 19 <sup>T</sup>	Electromyography Lecture	<b>Lab report #8 is due Research Project Proposal Due Research Project Presentations Due</b>
Nov 21 <sup>TR</sup>	<b><i>No Class – Thanksgiving Recess</i></b>	
Nov 26 <sup>T</sup>	Activity Lab #9 – EMG	
Nov 28 <sup>TR</sup>	Presentations	<b>Lab report #9 is due</b>
Dec 3 <sup>T</sup>	Presentations	
Dec 5 <sup>TR</sup>	Presentations/Final Exam Review	
Dec 12 <sup>TR</sup>	<b>Final Exam: 10:30AM – 1:15PM</b>	
<b><i>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.</i></b>		

### *Student Expectations*

- Students must adhere to the guidelines of the George Mason University Honor Code [See <http://oai.gmu.edu/honor-code/>].
- 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/policies/responsible-use-of-computing/>].
- 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.

### *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/>].

PROFESSIONAL BEHAVIOR: Students are expected to exhibit professional behaviors and dispositions at all times.

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.



## Student Acknowledgement of Syllabus

I, \_\_\_\_\_, by signing below, attest to the following:  
(Print First and Last Name)

\*I have read the course syllabus for KINE 400 in its entirety, and I understand the policies contained therein. This syllabus serves as a binding contract for KINE 400 between the instructor and me.

\*I have a clear understanding of the due dates for assignments and examinations, and I accept responsibility for the material.

\*I am aware that failure to submit assignments by the dates assigned will result in no points awarded as late work will not be accepted.

\*I understand that if I am using emitting sound technology or personal computers I will be dismissed from class for the day, counted as an absence, and not permitted to make up missed assignments

\*I understand the instructor reserves the right to alter the provided schedules as necessary and I am responsible for the assignments and examination dates for the most current version of the syllabus schedule.

\*I accept responsibility for reading announcements that are sent to me via e-mail through BlackBoard/MyMason Portal; it is my responsibility to access my Blackboard/MyMason Portal e-mail for messages, or forward Blackboard/MyMason Portal e-mail as per the directions provided in the syllabus.

\_\_\_\_\_  
(Signature) (Date)

*(Student Copy: This copy should remain attached to your syllabus)*

✂-----

## Student Acknowledgement of Syllabus

I, \_\_\_\_\_, by signing below, attest to the following:  
(Print First and Last Name)

\* I have read the course syllabus for KINE 400 in its entirety, and I understand the policies contained therein. This syllabus serves as a binding contract for KINE 400 between the instructor and me.

\*I have a clear understanding of the due dates for assignments and examinations, and I accept responsibility for the material.

\*I am aware that failure to submit assignments by the dates assigned will result in no points awarded as late work will not be accepted.

\*I understand that if I am using emitting sound technology or personal computers I will be dismissed from class for the day, counted as an absence, and not permitted to make up missed assignments

\*I understand the instructor reserves the right to alter the provided schedules as necessary and I am responsible for the assignments and examination dates for the most current version of the syllabus schedule.

\*I accept responsibility for reading announcements that are sent to me via e-mail through BlackBoard/MyMason Portal; it is my responsibility to access my Blackboard/MyMason Portal e-mail for messages, or forward Blackboard/MyMason Portal e-mail as per the directions provided in the syllabus.

\_\_\_\_\_  
(Signature) (Date)

*(Instructor Copy: Submit to the instructor at the end of the first class meeting)*