TIME & PLACE: Tu-Th 9:25-10:50 AM
Johnson Center-Rm 207

INSTRUCTOR: William R. Barfield, Ph.D., FACSM
Professor

OFFICE HOURS: Tu-Th 8:35-9:25

OFFICE: #213 Silcox Physical Education & Health Center

PHONE/FAX: 803/953-6746 / 803/953-6757

PREREQUISITE: Physics 101, Biology 202, & EXSC 330

GRADING: A, B+, B, C+, C, D, F

COURSE DESCRIPTION: This course will focus on the mechanical basis of human movement with some consideration given to the anatomical constraints that influence normal, athletic, and pathological movement. Topics covered will include linear and angular kinematics and kinetics of movement, equilibrium, and fluid mechanics.

COURSE TEXT: *Biomechanical Basis of Human Movement* –Fourth Edition
Joseph Hamill & Kathleen M. Knutzen

COURSE OBJECTIVES: The course objectives in biomechanics are to have students apply the mechanical knowledge gained in kinesiology and physics quantitatively to kinematic and kinetic forms of movement.

STUDENT LEARNING OUTCOMES:

1. Students will quantitatively solve human movement challenges from an athletic as well as from an injury and/or pathological perspective. This will be evaluated on test 1 and test 2.
2. Students will quantitatively solve two-dimensional measurement kinematically and kinetically. This will be evaluated on test 1 and test 2.
3. Students will conduct a literature review on a biomechanically topic and write and give an oral presentation to their peers and the professor. Students will be expected to score at least 80% of the combined written and oral presentation.
REQUIREMENTS:

Written Exams - 2 @25% each 50%
Research Project 25%
Final Exam 25%
TOTAL 100%

DESCRIPTION OF PROJECTS:
1. In-class activities will include lecture/presentation, small group discussion, problem solving, written examinations, and in-class research projects.
2. Out-of-class activities will include readings, study and project preparation.
3. Class Project Description (25%). Each student will be responsible for presenting an in-class group project concerning how one of the mechanical constructs we examine during the semester influences normal, athletic, or pathological movement. The presentation should be planned for 18 minutes with 5 minutes at the end for questions and/or comment. A referenced, written paper will be turned in the day of presentation. Project oral evaluation will be from Dr. Barfield and class members. Each group will also evaluate other members of their group, which will affect the project grade.

EXAMS:
Exam #1 (25%) will cover linear and angular kinematic quantities and how they relate to movement.

Exam #2 (25%) will cover linear and angular kinetic quantities, and equilibrium and how they relate to movement.

Final Exam (25%) will be comprehensive and will cover all information presented throughout the course including student projects.

EVALUATION SCALE:

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<tr>
<th>Percentage</th>
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<tbody>
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<tr>
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ATTENDANCE POLICY:
1. Students will be allowed two (2) unexcused absences, except during major evaluations. EACH UNEXCUSED ABSENCES in excess of two (2) will result in 2% being deducted from your final average. Students who miss more than 5 classes will be dropped from the course (WA).
2. Class will begin and end in a timely manner. You are expected to be prepared when class begins. Persistent tardiness will not be tolerated and may result in loss of points.
3. You are responsible for any work missed when you fail to attend class.
4. Two tardies will be the equivalent of one excused absence. Tardy means you are 1 minute late + for the start of class.

MAKE-UP POLICY:
1. Make-up exams will be given at the discretion of the professor when extenuating circumstances exist. It is the student’s responsibility to see the professor within three calendar days to request a make-up exam time and date.
2. Assignments that are not turned in at the designated time will be accepted at the discretion of the professor. Be aware that unusual circumstances must exist for acceptance of late assignments.

CELL PHONE/PDA POLICY:
The use of all PDA devices, including cell phones and laptop computers are expressly forbidden in the classroom. Texting, receiving or sending messages, cell phone use, or the use of laptop computers will result in immediate loss of points from your final class average and an absence will be recorded. If there is a 2nd violation of the class policy you will be awarded an F. The first violation will result in a 20 point deduction from your final class average. The 2nd violation is another 20 points, therefore making it impossible to successfully complete the class with a passing grade. Students must keep these devices turned off and out of sight during class. It is a violation of this policy to keep such devices on your lap, in your pocket or on the floor by your desk. Any suspicion of your use on my part will result in loss of points.

DISABILITY ACCESS STATEMENT:
Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged.

ACADEMIC HONOR CODE:
Students will be expected to abide by the academic honor code found in the most current edition of the Student Handbook.

PROJECTED COURSE OUTLINE:

January 7  | Introduction to Biomechanics
January 12 | Biomechanics of Movement & Sport
January 14 | Biomechanics of Movement & Sport
January 19 | Review of Linear Kinematics
            | vectors, resultants
January 21 | Review of Linear Kinematics
            | instantaneous velocity and acceleration
            | kinematics of gait
            | projectile motion
January 26  Linear Kinematics Review
January 28  Linear Kinematics Final Review
February 2  Introduction to Angular Kinematics
            axes of rotation and units of measurement
            angular motion and types of angles
February 4  Angular Kinematics
            relationship between linear and angular kinematics
February 9  Angular Kinematics
            angular kinematics of running
February 11 Angular Kinematics Review
            Update #1 on Biomechanics Project Due
February 16 Guest Lecture on Biomechanics Applications

Learning Activities: lecture, class discussion, in class problems and graphing.
February 18  Review Day for Exam #1
February 23  Exam #1
February 25  Linear Kinetics
            ground reaction forces
            other contact forces
March 1     Laws of Motion
March 3     Free-Body Diagrams
March 6-13  Spring Break
March 15    Special Force Applications
            pressure, mechanical work, energy, and power
March 17    Linear Kinetics Review and Summary
March 25    Introduction to Angular Kinetics
            center of gravity and center of mass
March 22    Rotation and Leverage
            lever classifications
            moment of inertia
Learning Activities: lecture, class discussion, in-class problem solving and article review.

March 24    Angular Momentum
            Update #2 on Biomechanics Project Due

March 29    Angular Analogs to Newton’s Laws of Motion

March 31    Quiz #2

April 5     Gait

April 7     Gait

April 12, 14, 19  Student Presentations

April 20    Last Class Day for EXSC 440-Spring 2015

April 26    Comprehensive Final Exam
            8:00-11:00 am