TIME & PLACE:  M-W-F 8:00-8:50 AM; Johnson Physical Education & Health Center-Rm 206

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

OFFICE HOURS:  M-W-F 9:00-11:00 AM & Tu-Th 10:00-10:45 AM

OFFICE:  #213 Silcox Physical Education & Health Center

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

PREREQUISITE:  Successful completion of Physics 101, Biology 202, & PEHD 330


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*  
Joseph Hamill & Kathleen M. Knutzen

COURSE OBJECTIVES:
1. Students will be provided a brief review of applied anatomy with particular reference to exercise and activity.
2. Students will learn the value of solving human movement challenges from an athletic as well as from an injury and/or pathological perspective.
3. Units of measurement, differences in scalar and vector quantities and two-dimensional and three-dimensional methods of measurement will be discussed and addressed.
4. Linear kinematic quantities will be addressed as they apply to movement of the body as well as projectiles.
5. Angular kinematics will be examined and understood, especially as it applies to creation of general planar motion.
6. Newton's Laws of Motion with respect to linear and angular kinetics will be addressed as they have application to an understanding of inverse dynamics.
7. Center of gravity, equilibrium and fluid mechanics will be discussed and examine
8. Students will have a greater understanding of various types of human motion and how these movements can be quantified.
9. Students will become more aware of technology and why it is important in the field of biomechanics, through labs, electronic class communication, and use of listservers to name a few.

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, written examinations, and in-class research projects.
2. Out-of-class activities will include readings, study and project preparation.
3. Class Project Description (30%). 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 45 minutes with 5 minutes at the end for questions and/or comment.
4. Participation involves class attendance and active involvement in the daily class activities.

EXAMS:

Exam #1 (20%) will cover linear and angular kinematic quantities and how they relate to movement.

Exam #2 (20%) will cover linear and angular kinetic quantities, and equilibrium and how they relate to movement.

Final Exam (20%) will be comprehensive and will cover all information presented throughout the course including guest lecture information and student projects.

EVALUATION SCALE:

- 90-100 A
- 88-89 A-
- 85-87 B+
- 80-84 B
- 78-79 B-
- 75-77 C+
- 70-74 C
- 68-69 C-
- 66-67 D+
- 64-65 D
- 62-63 D-
- <62 F

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.
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. When a student misses more than 4 classes they will be dropped from the course.

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, and if accepted, points will be deducted based on tardiness of assignment.

CELL PHONE/PDA/LAPTOP COMPUTER 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.

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 10  Introduction to Class and Biomechanics
January 12  Introduction to Biomechanics & Biomechanics of Movement & Sport
January 14  Introduction to Linear Kinematics
            vectors and scalars
            distance, displacement
January 17  NO Class-ML King Holiday
January 19  Introduction to Linear Kinematics
            speed, velocity
            acceleration
January 21  Linear Kinematics
            kinematics of gait
            projectile motion
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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>January 24</td>
<td>Review of Linear Kinematics</td>
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<td>March 26</td>
<td>Linear Kinematics</td>
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<td>March 28</td>
<td>Linear Kinematics</td>
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<tr>
<td>March 31</td>
<td>Introduction to Angular Kinematics</td>
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<td>April 2</td>
<td>Angular Kinematics</td>
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<td>April 4</td>
<td>No Class-Southeast ACSM</td>
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<td>April 7</td>
<td>Angular Kinematics</td>
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<td>April 9</td>
<td>Review of Linear &amp; Angular Kinematics</td>
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<td>April 11</td>
<td>Review for Exam #1</td>
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<td>April 14</td>
<td>Exam #1</td>
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<td>April 16</td>
<td>Introduction to Electromyography (EMG)</td>
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<td>April 18</td>
<td>Guest Lecture</td>
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<td>April 21</td>
<td>Introduction to Linear Kinetics</td>
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<td>April 23</td>
<td>Laws of Motion</td>
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<td>April 25</td>
<td>Linear Kinetics</td>
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<td>April 28</td>
<td>Free-Body Diagrams</td>
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Muddiest point(s)
March 2  Special Force Applications
       pressure, mechanical work, energy, and power

March 4  Linear Kinetics
       Review of any unclear area of linear kinetics

March 6-13  Spring Break

March 14  Introduction to Angular Kinetics
       center of gravity and center of mass

March 16  Rotation and Leverage
       lever classifications
       moment of inertia

March 18  Angular Momentum

March 21  Angular Analogs to Newton’s Laws of Motion

March 23  Special Torque Applications

March 25  Review of Unclear Areas in Linear & Angular Kinetics

March 28  Review for Exam #2

March 30  Exam #2

April 1   Mechanical Analyses of Movement
       Return Test #2

April 4   Clinical Gait Analysis

April 6   Clinical Gait Analysis

April 8   Clinical Gait Analysis and Example of Student In-Class Presentation

April 11  Clinical Gait Analysis

April 13,15,18,20,22  Student In-Class Projects

April 25  Last Class Day /Review for Final Exam

April 29  Comprehensive Final Exam