TIME & PLACE: M-W-F 11:00-11:50 AM; Room 111
Silcox Physical Education & Health Center

INSTRUCTOR: Miriam Klous, Ph.D.

OFFICE HOURS: Mo-Wed 3:15-5:45 PM or by appointment

OFFICE: Room 309 Silcox Physical Education & Health Center

PHONE/FAX: (843) 953 5565/ (843) 953 6757

EMAIL: klousm@cofc.edu

PREREQUISITE: Physics 101, Biology 202, & EXSC 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, and equilibrium mechanics.

COURSE TEXT: Biomechanical Basis of Human Movement – Third Edition
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 examined.

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.

**TENTATIVE GRADING:**

<table>
<thead>
<tr>
<th>Graded Items</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exams - 3 @15% each</td>
<td>45%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Research Project</td>
<td>20%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Final grade will be calculated using the formula:

$$0.45 \cdot \text{average grade written exam} + 0.25 \cdot \text{grade final exam} + 0.10 \cdot \text{average grade quizzes} + 0.20 \cdot \text{grade research project}$$

**GRADED ITEMS:**

1. **Exams:** There will be 4 exams, 3 exams will be held in class while the 4th exam will be held during final exam week. The format of the examinations will vary with the content which is being tested. Generally speaking, exams will be problem solving and critical thinking/interpretation format.

   **Exam #1 – Chapter 1 (15%):** will cover linear kinematic quantities and how they relate to movement.

   **Exam #2 – Chapter 1 & 2 (15%):** will cover linear and angular kinematic quantities and how they relate to movement.

   **Exam #3 – Chapter 3 (15%):** will cover linear kinetic quantities, and equilibrium and how they relate to movement.

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

   **Quizzes (10%):** problem solving questions or interpretations/critical thinking that will cover the main topics in linear and angular kinematics and kinetics. The quizzes might be announced (or not) and given during class time or online using OAKS. Also, it can be asked to submit the home work announced or unannounced. Homework may also be graded as a quiz.
2. Class Project Description (20%).
Each group (2-4 students) will be responsible writing a research paper discussing one of the mechanical constructs we examine during the semester and how it influences normal, athletic, or pathological movement. The paper should contain 3-4 pages (title page and references not included) and 4-5 references per person in the group. The paper layout:

- 1) Title page, 2) Introduction, 3) Body, 4) Discussion, 5) References
- Double spaced
- Margins: normal = bottom, top, left, right 1"  
- Times new roman 12

Each group will present their project in a 15 minute presentation with 5 minutes at the end for questions and/or comment. Two drafts of different papers will be peer reviewed by students of another group. There are five due dates for the project:
2. Outline of the paper including literature, due: February 22, 2013
3. A referenced, written paper, due: March 25, 2013

EVALUATION SCALE:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100%</td>
</tr>
<tr>
<td>A-</td>
<td>88-89%</td>
</tr>
<tr>
<td>B+</td>
<td>85-87%</td>
</tr>
<tr>
<td>B</td>
<td>80-84%</td>
</tr>
<tr>
<td>B-</td>
<td>78-79%</td>
</tr>
<tr>
<td>C+</td>
<td>75-77%</td>
</tr>
<tr>
<td>C</td>
<td>70-74%</td>
</tr>
<tr>
<td>C-</td>
<td>68-69%</td>
</tr>
<tr>
<td>D+</td>
<td>66-67%</td>
</tr>
<tr>
<td>D</td>
<td>64-65%</td>
</tr>
<tr>
<td>D-</td>
<td>62-63%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;62</td>
</tr>
</tbody>
</table>

ATTENDANCE POLICY:

Attendance is not required but strongly recommended.
Attendance will be taken randomly. In agreement with the honor code, you sign the attendance sheet only for yourself. In case of absence, you will be held responsible for the class material covered during your absence.

EXAMINATION AND MAKE-UP POLICY:

You will be notified at least one week in advance if there is a change in an exam date. Exams must be taken on the day assigned unless arrangements are made prior to the test date. All make up exams must be made up within one week of the original exam date. It is the students' responsibility to make the necessary arrangements. In case of unexcused absence, exams, quizzes or submission of homework assignments that are announced or unannounced cannot be retaken/resubmitted. If a student is absent on the day of an exam or quiz, he/she will receive a zero if the professor is not notified before class time. In case of taking a
make-up exam, the professor reserves the right to give you a different exam.

**ASSIGNMENT POLICY:** All assignments (research paper or homework) are due at the beginning of class (11 am) on the day they are due. Assignments can be submitted in hard copy or electronic copy to the instructor. If a copy is not received on time, 1 point will be subtracted for each hour the assignment is submitted late in the first 12 hours. After these 12 hours, 3 additional points will be subtracted for each 24 hours the assignment is submitted late (when submitting an assignment 13-37 hours late, you will lose 12 + 3 = 15 points)

**ELECTRONIC DEVICE POLICY:** Please turn off the sound of all electronic devices during class. NO TEXT MESSAGING or other forms of electronic communication permitted. Laptops are allowed to be used in class to take notes. Only **non-programmable** calculators will be allowed during exams: please plan accordingly.

**PROVISIONS FOR STUDENTS WITH SPECIAL NEEDS:**

The College of Charleston and I are committed to the full inclusion of all students. Students who have a documented disability and require academic accommodations should contact the instructor. Please do so during the first week of class of any accommodations needed for the course.

**COLLEGE OF CHARLESTONS HONOR CODE AND ACADEMIC INTEGRITY:**

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student’s actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student’s file. Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student’s transcript for two years after which the student may petition for the X to be expunged. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board. Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of
the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others’ exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the Student Handbook at http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php

COLLEGE OF CHARLESTON STUDENT HANDBOOK:
This is a guide to your responsibilities and rights as a student. If you are not familiar with this document, please take the time to review the information contained within the handbook. www.cofc.edu/studentaffairs/general_info/studenthandbook.html.

TENTATIVE COURSE OUTLINE:
*It is expected that you read (part of) the chapter that will be discussed in class in preparation for your class*

**Week 1** Intro, general, syllabus
   - Introduction to Biomechanics
January 9
January 11

**Week 2** Biomechanics of Movement and sport
   - Linear kinematics:
      - vectors, resultants
January 14
January 16
January 18

**Week 3** Linear kinematics
   - Instantaneous velocity and acceleration
January 23
January 25

**Week 4** Linear kinematics
   - Projectile motion
January 28: **Topic for research paper due**
January 30
February 1
**Week 5** Review linear kinematics  
February 4  
February 6  
February 8

**Week 6** Angular kinematics  
Introduction to angular kinematics  
Axes of rotation and units of measurement  
February 11: **Exam 1 – linear kinematics**  
February 13  
February 15

**Week 7** Angular kinematics  
Angular motion and types of angles  
Relationship between linear and angular kinematics  
February 18  
February 20  
February 22: **outline research paper due**

**Week 8** Angular kinematics  
Kinematics of gait  
Review angular kinematics  
February 25  
February 27  
March 1: **Exam 2 – linear and angular kinematics**

**Week 9** Spring Break  
March 4  
March 6  
March 8

**Week 10** Introduction to linear kinetics  
Types of forces  
March 11  
March 13  
March 15

**Week 11** Linear kinetics  
Free body diagram  
Laws of motion  
Effect of a force at an instant in time  
March 18  
March 20  
March 22
**Week 12** Linear kinetics  
   Laws of motion  
   Effect of a force applied over a period of time  
   Effect of force applied over a distance  
March 25: **Research paper due**  
March 27  
March 29  

**Week 13** Review linear kinetics  
   Introduction angular kinetics  
   Torque and moment of force  
   Newton’s Law of Motion: angular analogs  
April 1:  
   April 3  
   April 5: **Exam #3**  

**Week 14** Angular kinetics  
   Newton’s Law of Motion: angular analogs  
April 8  
   April 10  
   April 12  

**Week 15** In-class presentations  
April 15  
   April 17  
   April 19  

**Week 16** In class presentations and review  
April 22: In-class presentations  
April 24: Review for Final Exam  

**Comprehensive Final Exam May 3rd: 8:00-11:00 am**