TIME & PLACE: T, TH 10:50 AM-12:05 PM; Room 117 (section 1)
T, TH 1:40-2:55 PM; Room 111 (section 2)
Silcox Physical Education & Health Center

INSTRUCTOR: Miriam Klous, Ph.D.

OFFICE HOURS: T, TH 3:00-4:30 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: EXSC 201 or PEHD 201; Physics 101, 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, equilibrium, and fluid mechanics.

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

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></th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Written Exams- 2 @20% each</td>
<td>40%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
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<tr>
<td>Research Project</td>
<td>25%</td>
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<tr>
<td>TOTAL</td>
<td>100%</td>
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Final grade will be calculated using the formula:

\[
0.40 \cdot \text{average grade written exam} + 0.25 \cdot \text{grade final exam} + 0.10 \cdot \text{average grade quizzes} + 0.25 \cdot \text{grade research project}
\]

**GRADED ITEMS:**

1. **Exams:** There will be 3 exams, 2 exams will be held in class while the 3rd 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 (20%):** will cover linear kinematic quantities and how they relate to movement.
   - **Exam #2 – Chapter 1 & 2 (20%):** will cover linear and angular kinematic quantities and how they relate to movement.
   - **Final Exam – comprehensive (25%):** will be comprehensive and will cover all information presented throughout the course.

2. **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. Research Project Description (25%).
Each group (2-4 students) will be responsible writing a research paper or develop a documentary video discussing one of the mechanical constructs we examine during the semester and how it influences normal, athletic, or pathological movement. Each group will present their project in a 15-minute presentation with 5 minutes at the end for questions and/or comment.

- The paper should contain 3-4 pages (title page and references not included) and 3-4 references per person in the group. The paper layout should be:
  - 1) Title page, 2) Introduction, 3) Body, 4) Discussion, 5) References
  - Double spaced
  - Margins: normal = bottom, top, left, right 1"
  - TNR 12
- The video should be 4-6 minutes
  - The video should refer to 3-4 references per person in the group
  - Software of your choice can be used to make this video.
    Possible software to be used: ‘Coach my video’, ‘Ubersense’

There are two due dates for the project:
2. Outline of the project including literature due: January 22, 2013
3. Paper or video due: March 24, 2015

EVALUATION SCALE:

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90-100%</td>
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<tr>
<td>A-</td>
<td>88-89%</td>
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<tr>
<td>B+</td>
<td>85-87%</td>
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<td>B</td>
<td>80-84%</td>
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<tr>
<td>B-</td>
<td>78-79%</td>
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<td>C+</td>
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<tr>
<td>C</td>
<td>70-74%</td>
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<tr>
<td>C-</td>
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<td>D</td>
<td>64-65%</td>
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<tr>
<td>D-</td>
<td>62-63%</td>
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<tr>
<td>F</td>
<td>&lt;62</td>
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ATTENDANCE POLICY:
Attendance is required. Attendance will be taken every class. 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 (section 1: 10:50 am or section 2: 1:40 pm) 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 the chapter that will be discussed in class in preparation for your class

Week 1 Intro, general, syllabus
Introduction to Biomechanics
January 13
January 15: Partner and topic choice research project due

Week 2 Biomechanics of Movement and sport
January 20: Out of class assignment: work on outline of the research project including literature
January 22: Outline of the research project including literature due
Guest lecture Dr. Pfile: therapeutic exercise and biomechanical principles

Week 3 Linear kinematics
Linear kinematics: vectors, resultants & Instantaneous velocity and acceleration
January 27
January 29

Week 4 Linear kinematics
Projectile motion
February 3
February 5
**Week 5** Review linear kinematics  
February 10  
February 12: **Exam 1 – linear kinematics**

**Week 6** Angular kinematics  
Introduction to angular kinematics: Axes of rotation and units of measurement  
February 17  
February 19

**Week 7** Angular kinematics: Angular motion and types of angles & Relationship between linear and angular kinematics  
February 24  
February 26

**Week 8** Spring Break  
March 3  
March 5

**Week 9** Angular kinematics  
Kinematics of gait  
March 10  
March 12

**Week 10** Review angular kinematics  
March 17  
March 19: **Exam 2 – angular kinematics**

**Week 11** In-class presentations  
March 24: research project due - presentations  
March 26: presentations

**Week 12** Linear kinetics  
Introduction to linear kinetics & types of forces  
March 31  
April 2

**Week 13** Linear kinetics  
Free body diagram & Laws of motion: Effect of a force at an instant in time  
April 7  
April 9
**Week 14** Linear kinetics
  Laws of motion: Effect of a force applied over a period of time & Effect of force applied over a distance
  April 14
  April 16

**Week 15** Review for final exam
  April 21
  April 23

**Final exam - comprehensive**
**Section 1:** Tuesday, May 5 8:00-11:00 AM (had class T, TH 10:50 AM-12:05 PM)
**Section 2:** Thursday, April 30 12:00-3:00 PM (had class T, TH 1:40-2:55 PM)