Welcome to Biomechanics! Biomechanics is an integral part of any career that applies the principles of kinesiology (study of human movement). Biomechanics is unique from other fields in our profession, in that it allows for an appreciation of the “why.” That is, an understanding of basic biomechanics allows you to explain ‘why’ some techniques are better than others when it comes to performance, rehabilitation, and injury prevention. This is contrast to other fields that help you understand ‘which’ techniques to use and ‘how’ to perform them. I think you will find biomechanics to be a powerful tool that you will use throughout your life to improve, maintain, or recapture performance, health, and wellness.

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Office Hours: T, TH 12:00-1:30, W 9:00-10:30 or by appointment

Prerequisites: Bio 2000, Bio 2010, PEP 3250, and Math 1050

I. Course Description: Introduction and application of biomechanical principles important to human movement. In lab, students will experience hands-on application of principles in biomechanics.

II. Online Technologies: E-mail, Canvas, Panopto, and Lecture MP3/IPOD downloads

III. Required Materials:
B. Supplementary hand-outs and lab assignments (available in lecture).
IV. **General Course Objectives (please see the specific course objectives handout for more details):** At the completion of this course, students should be able to:

A. Demonstrate an understanding of basic anatomical and biomechanical terminology.
B. Define and apply basic biomechanical concepts to human movement situations.
C. Describe anatomical and biomechanical factors that influence muscle force production.
D. Define and apply kinematic and kinetic measures to linear and angular human motion in order to quantify various aspects of movement.
E. Define torque and discuss why it is a measure of human strength.
F. Explain how mechanical factors affect a body’s stability.
G. Identify the factors that influence torque production in the intact musculoskeletal system.

V. **Tentative evaluation points:**

A. Exams (56% of total):

<table>
<thead>
<tr>
<th>Exam</th>
<th>Points</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>80</td>
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<tr>
<td>Exam 2</td>
<td>65</td>
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<tr>
<td>Exam 3</td>
<td>80</td>
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B. Laboratory (30% of total):
   a. Research project 20 points

C. Introductory problems 0 points

D. Assignments/attendance/quizzes (14% of total): 55 points

Points possible......................................................................400 points

VI. **Description of evaluation components:**

A. **Exams:** There are three lecture exams that will be multiple choice, fill-in-the-blank, and short answer formats.

B. **Laboratory:** The laboratory is meant to give you hands-on experiences in applying the concepts presented in the course content sections. The lab is worth about 30% of your grade and will require you to complete 7-10 different laboratory assignments, a research project, and two substantial quizzes. Details will be given during your first laboratory activity.

C. **Introductory problems:** At the end of each chapter in your text book there are introductory problems that help you appreciate the information presented during lectures and laboratories. The answers to most questions are provided and therefore you are encouraged to complete these problems but you will not turn in your answers. I would also encourage you to complete the “Sample Problems” which are found within the text of each chapter.
D. **Assignments/attendance/quizzes:** There will be numerous assignments given throughout the semester. The assignments reinforce and apply key principles from the content presented during lectures. The course outline indicates their due date. Quizzes will be announced and unannounced.

E. **Research project:** Today, much of the new scientific knowledge is first reported to the scientific community via an oral or poster presentation at a scientific conference. Usually, in order to present new scientific knowledge at such a conference, scientists must first submit a short abstract describing the findings of their scientific study. This semester you will be asked to research a topic that involves biomechanics and conduct a short study on the topic. You will prepare a short abstract that describes your research findings. The details for the project will be presented in lab. The project due date is indicated on the course outline.

**VII. Tentative Grading Scale (points):**

- A 400-372 points  
- A- 371-360 points  
- B+ 359-348 points  
- B 347-332 points  
- B- 331-320 points  
- C+ 319-308 points  
- C 307-292 points  
- C- 291-280 points  
- D+ 279-268 points  
- D 267-240 points  
- F < 239 points

**Tentative Grading Scale (percentages):**

- A 100-93 %  
- A- 93-90 %  
- B+ 90-87 %  
- B 87-83 %  
- B- 83-80 %  
- C+ 80-77 %  
- C 77-73 %  
- C- 73-70 %  
- D+ 70-67 %  
- D 67-60 %  
- F < 60 %

**VIII. General Information:**

A. Academic honesty policy: USU’s policies and recommendations for academic honesty will be followed (see the USU general catalog or [http://catalog.usu.edu/content.php?catoid=3&navoid=265](http://catalog.usu.edu/content.php?catoid=3&navoid=265)). Plagiarism will result in no credit for the given assignment. Late assignments will result in dropping a letter grade for that assignment.

B. Notice on lab fees ($15): As part of your registration for this class, you were required to pay a “lab fee.” This fee is used to buy and maintain software and hardware used during laboratory and lecture activities. All of the fees are used to enhance your learning opportunities in this course.
C. Make-up exam policy: If you anticipate an absence or a schedule conflict with an exam, see me at least one week prior to the exam, and you may be able to schedule an alternate time. Emergencies will be handled on an individual basis, however if an emergency causes you to miss an exam, you need to call me (see phone number above) the day of the exam (leave a detailed message if necessary). There are NO make-up exams for individuals who approach me about a missed exam AFTER the exam has been given.

D. Exam return policy: Exams will be returned on the 1st or 2nd class meeting following the Exam. Questions or concerns regarding the exam or components of the exam must be addressed during office hours in writing and not immediately after class.

E. Exam dates and lecture topics may change depending on class progress.

F. Special needs: If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center. In cooperation with the Disability Resources course, material will be provided in alternative formats such as large print, audio diskette, or Braille.

G. Source guides (some journals with biomechanical content related to class discussions):
   - Journal of Biomechanics
   - Journal of Applied Biomechanics
   - Journal of Electromyography and Kinesiology
   - Medicine and Science in Sports and Exercise
   - American Journal of Sports Medicine
   - Journal of Orthopaedic & Sports Physical Therapy
   - Ergonomics
   - Physical Therapy