

## EXS3070 Syllabus

### Applied Exercise Anatomy and Biomechanics

**Instructor:** Andrew (Tony) Pustina PhD, CSCS, USAW II, ISAKII    Office: TARC 2010B  
 Phone: 262-551-6174    email: apustina@carthage.edu  
 Office Hours: MWF 9:05am-10:30

**Course Description:** MWF 8:00-9:05am; TARC 2020; 4 Credit Hours.

This course is designed to introduce students to the biomechanics of human movement. The course will be an analysis of how muscles, bones, and joints produce movements related to sport and everyday life. Force plates will be used during labs to assess kinetic demands of various movements. Video analysis will be used to assess kinematic demands of walking and running.

**Text:** *Manual of Structural Kinesiology* by R.T. Floyd (Most recent is 21<sup>st</sup> ed., but any edition will work)

In performing the analysis of a sport skill, the human body is often viewed as a "machine" subject to the same laws and physical principles that govern the actions of any machine. The analysis of sport performance involves the identification of laws and principles that help to explain the mechanical reasons for success or failure. Relating these laws and principles to sport is the basis of this course.

**Course Format:** Lecture, lab, and discussion.

**Course Objectives:**

1. Apply Biomechanical principles (Newtonian Physics, levers, forces & torques) to enhance human performance.
2. Describe the basic physiological process of movement generation.
3. Identify a given bone or muscle by name, anatomic location, or function.
4. Analyze joint actions and the associated muscle actions during complex movements.
5. Operate force plates to collect data and analyze force time curves.
6. Explain how to develop exercise programs that can be applied in fitness, rehabilitation, physical education, and strength & conditioning settings.

**Grading Scale:**

A	94- 100%	A-	90- 93%		
B+	87 – 89%	B	84 – 86%	B-	80 – 83%
C+	77 – 79%	C	74 – 76%	C-	70 – 73%
D	64 – 66%	D-	60 – 63%	D+	67 – 69%
F	< 60%				

**Tests:** Four exams will include short answer, mathematical problem solving, and multiple choice questions. Questions will test your knowledge and application of the assigned readings, power points, and class discussions. The final exam will be a cumulative final exam.

**Quizzes:** Students will take approximately two quizzes for each chapter (4-7 & 9-12): one on the muscles and one on the bones. These quizzes contain about 10 fill-in-the-blank questions. Do not expect word banks. These quizzes will require you know the location of various bony landmarks, muscle origins, insertions, and actions.

**Sport Movement Analysis Project:** At the end of the semester, you will have a chance to apply a mechanical principles using the sport skill of your choice. You will perform a biomechanical analysis of a movement and coach an individual while they perform the exercise.

## University and Instructor Policies

### ***Communication***

Our class website can be found Schoology (lms.carthage.edu). You are responsible for announcements and assignments that are placed on Schoology. You have the ability to check your grade on this site and are responsible for doing so to avoid grade discrepancies or possible errors. In addition, all students are required to use their Carthage email accounts

### ***Attendance policy***

Attendance is extremely important for students to successfully complete the requirements of this course. Therefore, it is highly suggested that students attend every meeting of this course. Students are responsible for all work that is assigned during classes that are missed.

**Students will be allowed 3 absences. Each unexcused absence over 3 will result in a 10-point grade reduction that will be calculated at the end of the semester.**

*Officially Excused Absences:* (1) due to a medical issue that has been confirmed by a doctor and/or the Dean of Students' Office (COVID-19); or (2) because of participation at an official Carthage event as part of their membership in a Carthage organization or membership on a Carthage athletic team, instructors are expected to make reasonable accommodations that allow students to address missed class time and/or missed work related to their absence.

### ***Practice Good Time-Management and Organization Skills***

You should expect to spend about 3 hours and 15 minutes in class each week, and on average 4-6 hours each week reading, studying, etc. In other words, you should dedicate about 8 hours each week to this course in order to earn an average grade or better. You will have to memorize diagrams, body parts, and learn many vocabulary words. I have found that it is best to use short, but frequent study sessions. I would go over diagrams 2-3 times per day for about 10-15 minutes to make them stick. Then at the end of the semester, when you take the cumulative final, you will already have a strong grasp of the content. Cramming for the final WILL NOT work.

### **Learning Accessibility Service**

Carthage College strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers due to your disability (including mental health, learning disorders and chronic medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, you also need to register with Diane Schowalter in Learning Accessibility Services ([dschowalter1@carthage.edu](mailto:dschowalter1@carthage.edu)).

### **ACADEMIC INTEGRITY STATEMENT:**

The integrity of the classes offered by Carthage College or any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For more information regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Academic Honesty Guidelines:

<https://www.carthage.edu/community-code/academic-concerns/academic-honesty-guidelines/>

Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me *before* the assignment is due to discuss the matter.

## Schedule

Readings should be completed *prior* to class. Lectures should be reviewed after each class. Content should be reviewed often, rather than crammed just prior to exams. You are expected to take responsibility for your own learning. This is a tentative course outline.

**THIS SYLLABUS AND SCHEDULE ARE NOT INTENDED TO BE ALL INCLUSIVE AND MAY BE CHANGED AS CIRCUMSTANCES DICTATE. ANY SUBSTANTIVE CHANGES THAT ARE MADE WILL BE PRESENTED IN CLASS.**

### Lab Exam

Week	Monday	Wednesday	Friday
1	9/6 No Class	9/8 Intro & Syllabus Ch 1	9/10 1 Fundamentals
2	9/13 1 Goniometer Lab	9/15 2 Muscle Physiology	9/17 2 Nervous System EMG Demo
3	9/20 2 Proprioceptors VJ Lab	9/22 2 PNF Stretch	9/24 3 Biomechanics Lever Intro
4	9/27 3 Biomechanics Math	9/29 3 Newtonian Biomechanics	10/1 Ch 1-3 Test
5	10/4 Ch 4 Lecture 5 bones	10/6 4 & 5 Bone Quiz/5 lecture	10/8 4 & 5 Muscle Quiz
6	10/11 6 Lecture	10/13 6 Bone Quiz & Press/Pull Lab	10/15 6 Muscle Quiz/ 7 Lecture
7	10/18 8 Anthropometry Lab	10/20 7 Bone Quiz Online	10/22 7 muscle Quiz
8	10/25 Fall Break	10/27 Overhead Lab	10/29 12 Spine/8 Upper Body
9	11/1 9 Hip Lecture	11/3 9 Bone Quiz Isopull Lab	11/5 9 Muscle Quiz/ 10 Lecture
10	11/8 Vertical Jump on Force Plate	11/10 10 Muscle Q & Isopull	11/12 10 Bone Q Squat fast/slow Lab
11	11/15 Loaded Jump Lab	11/17 Depth Jump Lab	11/19 Lab Work Day
12	11/22 11 Bones	11/24 Thanksgiving	11/26 Thanksgiving
13	11/29 11 Lecture, Introduce Project	12/1 11 Bone Q, Gait Analysis	12/3 11 Gait Analysis Lab
14	12/6 13 Coaching Snatch and Clean	12/8 Final Project Work Day	12/10 Bone Final
15	12/13 Final Presentation	12/15 Final EXAM TUESDAY 8am??	12/17