

Human Biomechanics

AANT 304

Fall 2018

Lecture Time: M&W 11:30-12:25

Lecture Location: ES 241

Instructor: Dr. Cara Ocobock

Office Location: A&S 119

Office Hours: M 1:00-3:00

Email: cocobock@albany.edu

Phone: (518) 442-4717

Lab Time: Tuesday 5:45-6:40, Thursday 10:15-11:10, or Friday 2:45-3:40

Lab Location: CS B23

Instructors:

Alexandra Niclou

Office Location: A&S 206

Office Hours: W 12:30-2:30

Email: aniclou@albany.edu

Florence Lee

Office Location: A&S 106

Office Hours: W 1-3

Email: flee2@albany.edu

Pre-requisites & Co-requisite

In order to register for this course, students must have previously taken and passed AANT 110 (Introduction to Human Evolution) and AANT 211 (Human Population Biology). Students must have either previously passed or be currently enrolled in AANT 316 (Human Anatomy & Physiology I).

Course Description

This course explores how humans move with the goal of providing a strong foundation for future training and clinical practice. During the first part of the course, we will cover fundamental concepts and terminology, basic joint mechanics, muscle physiology, and applied biomechanics. The rest of the class will focus on the regional biomechanics and evolution of the human upper extremity, axial skeleton, and lower extremity. This course approaches human biomechanics qualitatively, not quantitatively, which means you **DO NOT NEED PHYSICS** for this class! Don't let the fear of math keep you away from learning how and why we move the way we do.

Course Objectives

1. Define key terms in human kinesiology and biomechanics.
2. Identify and describe the various movements of each body part and how they move through the 3 planes of motion.
3. Explain the core concepts of biomechanics including:
 - a. The relationship between gravity, weight, mass and inertia

- b. The difference between speed, velocity, and acceleration
 - c. The difference between linear, angular, and general motion
 - d. Identification of forces, acceleration, momentum, work, power, and energy
4. Observe and describe the mechanical purpose of a human movement and determine the anatomical and mechanical factors of an observed movement through qualitative assessment.
 5. Describe and identify the key components of each major joint.
 6. Increase cognitive awareness of biomechanical factors in daily activities.

Course Text

1. Kinesiology of the musculoskeletal system, 2017, 3rd Ed.
Donald A. Neumann
ISBN-13: 978-0323287531
ISBN-10: 0323287530
1. A few select articles posted to Blackboard

Assessment

You will be evaluated in this class through 4 non-cumulative, take home exams and in class lab assignments. Each exam is worth 100 points. There will be 13 lab assignments, each worth 10 pts (total of 130 points). Total points possible in this class: 530 pts. Your final grade will be determined based on a percentage (total points/530 * 100%).

Grade Scale

This course is graded on an A-E scale. Below are the minimum percentages required for each grade:

A: 93 %	A-: 90%	B+: 87%	B: 83%	B-: 80%	C+: 77%
C: 73%	C-: 70%	D+: 67%	D: 63%	D-: 60%	E: below 60%

Attendance

Since a large part of this course will revolve around discussion, your attendance is crucial. Excused absences include: 1) UAlbany sporting or sanctioned event 2) Death in the family 3) Religious observance 4) Illness requiring your physical presence at a doctor or hospital 5) A professional interview. I WILL NOT provide make-up assignments for any excuse other than the five listed above. **NO EXCEPTIONS!** Please refer to the “Attendance and Timely Compliance with Course Requirements” section of the university’s Undergraduate Academic Regulations for more details (http://www.albany.edu/undergraduate_bulletin/regulations.html). Be aware that the University Health Center will provide medical excuses only under very specific situations (http://www.albany.edu/health_center/medicalexexcuse.shtml).

Academic Integrity

Plagiarism and cheating will not be tolerated. For full information on the University’s Standards of Academic Integrity, please see: http://www.albany.edu/eltl/academic_integrity.php.

Disability Services

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability

requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations.

On a Personal Note

Any student who faces challenges securing their food or housing or faces a catastrophic event (death or illness in the family for example) and believes this may affect their performance in the course is urged to contact the Vice Provost for Undergraduate Education ((518) 442-3950, or by email to UGEducation@albany.edu) for support. Furthermore, please notify me if you are comfortable in doing so. This will enable me to provide any resources that I may possess.

Please note: I reserve the right to change this syllabus at any time.

Tentative Class Schedule

Date	Topic	Reading	TAKE HOMES
8/27/18	Intro & Kinematics	Chapter 1 (pg 3-11)	
8/29/18	Kinematics Continued	Chapter 1 (pg 3-11)	
9/3/18	NO CLASS LABOR DAY		
9/5/18	Kinetics	Chapter 1 (pgs 11-23)	
9/10/18	NO CLASS ROSH HASHANNAH		
9/12/18	Articulations	Chapter 2	
9/17/18	Biomechanics Fundamentals	Chapter 4 (pgs 77-94)	
9/19/18	NO CLASS YOM KIPPUR		
9/24/18	Muscles Part 1	Chapter 3	
9/26/18	Muscles Part 2	Chapter 3	EXAM #1 HANDED OUT
10/1/18	Anatomy of Mastication	Chapter 11 (pgs 437-452)	EXAM #1 TURNED IN
10/3/18	Mechanics of Mastication	Chapter 11 (pgs 437-452)	
10/8/18*	Mastication through Time	Strait et al. 2007 Demes & Creel 1988 Ichim et al. 2006 Holton et al. 2013	
10/10/18*	Anatomy of Throwing	Chapters 5 & 6	
10/15/18	Anatomy & Mechanics of Throwing	Chapters 5 & 6	
10/17/18	Mechanics of Throwing	Chapters 5 & 6	
10/22/18	Shoulder Injuries & Evolution of Throwing	Roach et al. 2013 Young 2003 Morgan & Carrier 2013	EXAM #2 HANDED OUT

10/24/18	Anatomy of Deadlift & Breathing Part 1	Chapters 9, 10 & pgs 453-462	EXAM #2 TURNED IN
10/29/18	Anatomy of Deadlift & Breathing Part 2	Chapters 9, 10 & pgs 453-462	
10/31/18	Mechanics of Deadlift & Breathing Part 1	Chapters 9, 10 & pgs 453-462	
11/5/18	Mechanics of Deadlift & Breathing Part 2	Chapters 9, 10 & pgs 453-462	
11/7/18	Back Injuries & Posture	Chapters 9, 10 & pgs 453-462	EXAM #3 HANDED OUT
11/12/18	Anatomy of Walking	Chapters 12, 13, & 14	EXAM #3 TURNED IN
11/14/18	Anatomy of Walking	Chapters 12, 13, & 14	
11/19/18	Gait Cycle & Determinants	Chapter 15	
11/21/18	NO CLASS THANKSGIVING		
11/26/18	Muscle Activation	Chapter 15	
11/28/18	Pathological Walking	Chapter 15	
12/3/18	Running vs. Walking	Chapter 16	
12/5/18	Evolution of Bipedalism & Running	Lovejoy 1988 Schmitt 2003 Harcourt-Smith & Aiello 2004 Pontzer et al. 2009	
12/10/18	Squish Room Day		EXAM #4 HANDED OUT
12/12/18	EXAM #4 TURNED IN BY 1pm NO EXCEPTIONS		