

USC Dornsife
College of Letters,
Arts and Sciences

**HBIO-401L – Physiology and Biomechanics of
Movement**

**Units: 4
Spring 2020**

**Lecture: T/Th 8:00 AM - 9:20 AM
Location: VKC 110**

**Laboratory: Th 5:00 PM – 7:50 PM
Location: PED B12**

**Instructors: Gioia Polidori, PhD
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Lab Director: Emi Embler, PhD

Course Description

The study of human movement including (1) bioenergetics, circulation, respiration, and the musculoskeletal system, (2) effects of exercise and training on those systems, and (3) basic laws of motion and analysis of sports locomotion. Prerequisite: MATH 108.

This course has a capstone project and thus it is strongly recommended that students take this course in their senior year.

Learning Objectives

- Identify, locate, and describe the structure/function of cells, their subcellular components, tissues, organs, and organ systems involved with exercise physiology.
- Explain principles of bioenergetics, physiological homeostasis and the interrelationship between form and function for the endocrine, cardiovascular, musculoskeletal and nervous systems as they apply to exercise
- Apply scientific knowledge as well as analytical and experimental skills to produce integrative original work in exercise physiology and biomechanics
- Compile, analyze, synthesize and criticize primary articles. Use discipline-related criteria to identify which opinions can be accepted, rejected or need further study.
- Formulate a testable hypothesis, design and conduct experiments, present interpretations of results articulating reasoned conclusions related to human movement
- Safely and properly use scientific equipment, databases and statistical test
- Apply principles of physiology and biomechanics to explain how physical activity and exercise may contribute to the resolution of the obesity pandemic as well as environmental issues
- Discuss and analyze the interplay and relative influence of biology and social context on dimensions of human diversity and exercise physiology.

Required Text:

Powers, S. and E. Howley, E. (2011). Exercise physiology: theory and application to fitness and performance (9th ed.). New York, NY: McGraw-Hill.

Description and Assessment of Assignments

- Class material will be evaluated via quizzes and exams.
- Material covered in labs will be evaluated via laboratory exercises and quizzes as well as classroom exams.

Grading Breakdown:

Assignment	% of Grade
Midterm 1	20
Midterm 2	20
Final Exam	30
Lab	25
Quizzes	5
TOTAL	100
JEP (extra Credit)	2.5

Additional Policies

- The grading scale is based on the traditional scale as follows:

	A (≥ 93.00%)	A- (≥ 90.00%)
B+ (≥ 87.00%)	B (≥ 83.00%)	B- (≥ 80.00%)
C+ (≥ 77.00%)	C (≥ 73.00%)	C- (≥ 70.00%)
D+ (≥ 67.00%)	D (≥ 63.00%)	D- (≥ 60.00%)
F (≤ 59.99%)		

- A midterm exam can be taken after the specified date **ONLY** if the student has a **documented** medical excuse.
- Exams and lab grades will not be given a letter grade. Only the final grade will be given a letter grade.
- Quizzes will be given in 2 forms:
 1. A 2-question quiz will be given during the *first 5 minutes* of each lecture. Questions will be based on the material covered in the previous lecture. Each quiz will be worth 2 points: 1 point for each correct response, 0.5 points for each incorrect response.
 2. During lectures and based on the material discussed.

Individuals who do not take the quiz will get 0 points. **NO LATE QUIZZES WILL BE GIVEN.**

- The final exam is ***cumulative***.
- A request to take a make-up exam must be accompanied by evidence of necessity (ie: letter from a doctor, plane ticket to a game from an athlete) and must be made ***before*** the date of the scheduled exam. Make-up exams will be different from the scheduled exam and may be proctored by personnel who do not have extensive knowledge in the area being tested.
- Notes will **NOT** be posted on blackboard. Class notes and textbook information will form the basis of the material that will be on the exams. If you attend class regularly, you will be updated on the status of lecture notes and course material/announcements.
- The **only** extra credit offered for this course is JEP. JEP is the oldest and largest university service-learning program in the country. It offers students the unique opportunity to combine academic coursework with experiences in the community surrounding the campus. At the beginning of the semester, a JEP representative will visit our class and tell you more about the opportunities available that semester. To register for JEP, visit <http://dornsife.usc.edu/joint-educational-project/>.

Course Schedule: A Weekly Breakdown

Date	Lecture Topic	Reading Assignment	Lab
Jan 14	Introduction, Physiology of Exercise		Intro
Jan 16	Bioenergetics I	3	
Jan 21	Bioenergetics II	3	Locomotor Energetics
Jan 23	Exercise Metabolism	4	
Jan 28	Hormonal Responses to Exercise I	5	Hormonal Response
Jan 30	Hormonal Responses to Exercise II	5	
Feb 4	Nervous System	7	Stretch Reflex
Feb 6	Musculoskeletal System I	8	
Feb 11	Musculoskeletal System II	8	Muscle Stimulation
Feb 13	Circulatory System	9	
Feb 18	Respiratory System	10	Blood Pressure
Feb 20	Acid/Base & Temperature Regulation	11-12	
Feb 25	Physiology of Training/Review	13	Pulmonary Function
Feb 27	MIDTERM 1		
Mar 3	Cause-Effect, Motion Analysis		Motion Analysis
Mar 5	Linear Kinematics		
Mar 10	Linear Kinematics		Kinematics
Mar 12	Angular Kinematics		
Mar 15-22	SPRING RECESS		No Lab
Mar 24	Linear Kinetics ($F=ma$)		$F=ma$
Mar 26	Linear Kinetics ($F=ma$)		
Mar 31	Linear Impulse		Project Meetings
Apr 2	Projectile Motion		
Apr 7	Projectile Motion		Project
Apr 9	Angular Kinetics		
Apr 14	Joint Kinetics		Project
Apr 16	Joint Kinetics		
Apr 21	MIDTERM 2		Project
Apr 23	Real World Examples		
Apr 28	Real World Examples		Project Presentations
Apr 30	Review		
May 2-5	STUDY DAYS		
May 13	FINAL EXAM 8:AM – 10:00 AM		

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086
equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

studentaffairs.usc.edu/ssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.