

Biological Sciences 10500 Metabolism and Exercise Fall 2017

This sequence (Bios 10500 and Bios 10501) examines the flow of energy through the human body —from what we eat to what we can do. Basic physiology, cellular metabolism, and exercise concepts are covered from cells to systems. The course sequence is designed for the non-biology major student to acquire some basic knowledge of biologic function. Bios 10500, the first course in the sequence, focuses on Human Physiology and Exercise and is intended to be followed by BIOS 10501 Metabolism and Nutrition. These two courses together will satisfy the biology core requirement.

Course Director/Instructor	Office Location	Phone	Email
John M Kennedy, PhD	BSLC, Rm 422	702-5759	jmkennedy@uchicago.edu

Teaching Assistants

Lecture TAs

Camelia Malkami
Email: cmalkami@uchicago.edu

Kelsey Hopkins
Email: klhopkins@uchicago.edu

Cate Chu
Email: cpchu@uchicago.edu

Lab TAs

Tuesday Lab (Sec 1A and 1B)
Meera Dhodapkar
Email: mdhodapkar@uchicago.edu

Wednesday (Sec 2A and 2B)
Michael Stubna
Email: mwstubna@uchicago.edu

Thursday Lab (Sec 3A and 3B)
David Farr
dfarr@uchicago.edu

Course Text (*note text will also be used in Bios 10501 Winter quarter*)

REQUIRED *Physiology of Sport and Exercise 6th Edition with Web Study Guide* by Kenney, Wilmore, & Costill 6th edition (2015) ISBN 9781450477673 Available at bookstore or the publisher <http://www.humankinetics.com>. A loose-leaf version is also available ISBN: 9781492546016 and an ebook ISBN 9781492512134. In addition, selected chapters and pages from *Human Physiology*, by Lauralee Sherwood, will be posted at Canvas and are required reading.

Philosophy

This course is concerned with the problems of multi-cellular animals and their various solutions to those problems that enable them to maintain homeostasis. Although single cells are remarkably complex systems, the evolutionary step to multi-cellular organisms has created significantly greater challenges, requiring cells to specialize. We will explore these specializations within the context of describing how tissues, organs, and organ systems are able to perform their task of maintaining homeostasis during exercise.

The biology we study is a dynamic subject, and neither you nor your instructors will ever know enough. The questions we raise in class and lab are in many instances the same ones reported in current biology journals and investigated in the

labs of our faculty by professors and students alike. The only thing we are sure of is that the rules of Physics and Chemistry will always apply, and the scientific method is our tool. We apologize for your need to learn facts in this course, but these are what allow us to build and evaluate ideas, hypotheses, and theories. Try not to lose yourselves in the forest because of the trees.

Your instructors come to you from a lifetime in biomedical research and medicine. Perhaps this can explain our unspoken perspective in the lectures. It also explains why we emphasize the lab as a mode of experiential learning. We have structured the labs so that you will need to work in groups, because that is the way modern science is advanced.

Course Organization

This course is comprised of lectures (3 per week) and a series of 3 exercise physiology labs. The lecture and lab schedules are summarized on the following pages.

Come To Class, Come to Class, ALWAYS Come to Class!

Attend all of the lectures. Some material presented in class is not discussed in the textbook. The lectures will help you to prioritize information in the reading assignments with respect to its importance on the exams.

Labs

Attendance at the weekly laboratory exercises is mandatory. The lab reading assignments will be posted as PDFs on the Canvas website and should be completed BEFORE your assigned lab section. Please note that it is not possible to “make up” missed labs, as the equipment is stored away or used by another class after the lab is finished. In the event that illness or other excused absence prevents you from attending your lab session, please contact your teaching assistant and/or Dr. Kennedy for assistance with temporary assignment to another lab group. A laboratory worksheet is provided for each lab and must be completed and submitted by your lab group within one week of completion of your lab.

Quizzes

Five multiple choice quizzes based on reading assignments and lecture material will be posted on Canvas during the quarter. You will be able to take each quiz up to three times and only your highest score will be counted. You will have from 5:00 pm Friday until 1:00 pm Monday to complete the quizzes on the weeks that they are posted.

Review Sessions

Starting in Week 2, the Lecture TAs will hold weekly discussions of the lecture material. The days, times, and locations will be posted during the first week of class. These review sessions are an opportunity for discussion — attendees are encouraged to come prepared with questions.

Exams

<u>Exam</u>	<u>Date of Exam</u>	<u>Material Covered</u>
Midterm 1	Fri, Oct 20	Sept 25 – Oct 16
Midterm 2	Fri, Nov 10	Oct 18 - Nov 6
Midterm 3	Mon Dec 8 (10:30 – 12:30)	Nov 8 – Nov 29

Grading

Your grade for the course will be determined based on Midterm Exam 1 (20%), Midterm Exam 2 (20%), Midterm Exam 3 (20%), performance in the 3 labs (25%), and performance on the 5 lab quizzes (15%). Completing the various course evaluations at the end of the course will earn you 6 points to boost your final grade.

Office Hours

Dr. Kennedy will have formal office hours on Mondays from 2:30-4:00 pm (BSLC 422) and is available at many other times by appointment (particularly after Labs are completed at 4:30 pm on Tues, Wed, Thur). The lecture TAs are available to provide help with the lecture material (see Chalk for hours and locations of TA lead review sessions).

BIOS 10500: METABOLISM AND EXERCISE, Fall 2017

Lectures: MWF 11:30-12:20 in BSLC 001

Labs: T/W/R 1:30-4:20 p.m. in BSLC 420

Review Sessions: TBD

Week	Date		Lecture Topic	Lecturer	Lab
1	Sept. 25	M	Course Introduction and Principles of Homeostasis	Kennedy	No Lab
	Sept. 27	W	Cell Structures and Membrane Transport Mechanisms	Kennedy	
	Sept. 29	F	Cellular Communication and Membrane Potentials	Kennedy	
2	Oct. 2	M	Impulse Conduction and Synaptic Transmission	Kennedy	No Lab
	Oct. 4	W	Muscle Structure and the Molecular Mechanisms of Contraction	Kennedy	
	Oct. 6	F	Neuromuscular Relationships and Force Regulation	Kennedy	
3	Oct. 9	M	Bioenergetics and Muscle Metabolism	Kennedy	Lab 1: Groups A,B,C
	Oct. 11	W	Muscle Fatigue	Kennedy	
	Oct. 13	F	Neural Regulation of Muscle Contraction	Kennedy	
4	Oct. 16	M	Smooth Muscle and the Autonomic Nervous System	Kennedy	Lab 1, Groups D,E,F
	Oct. 18	W	Cell and Electrical Properties of the Heart and the Cardiac Cycle		
	Oct. 20	F	Exam #1 (Sept. 25 – Oct 16) – 10 lectures		
5	Oct. 23	M	Regulation of Cardiac Output	Kennedy	Lab 2, Groups A,B,C
	Oct. 25	W	Vascular Resistance and the Regulation of Blood Pressure	Kennedy	
	Oct. 27	F	The Microcirculation and Blood	Kennedy	
6	Oct. 30	M	Lung Mechanics and Ventilation	Kennedy	Lab 2, Groups D,E,F
	Nov. 1	W	Gas Transport and the Regulation of Breathing	Kennedy	
	Nov. 3	F	Cardiovascular Responses to Exercise	Kennedy	
7	Nov. 6	M	Respiratory Responses to Exercise	Kennedy	Lab 3, Groups A,B,C
	Nov. 8	W	Adaptation to Resistance Exercise		
	Nov. 10	F	Exam #2 (Oct. 18 – Nov. 6) – 8 lectures		
8	Nov. 13	M	Adaptation to Aerobic Exercise	Kennedy	Lab 3, Groups D,E,F
	Nov. 15	W	Overview of Kidney Function	Kennedy	
	Nov. 17	F	Regulation of Water Balance	Kennedy	
9	Nov. 20	M	pH Regulation	Kennedy	No Lab
	Nov. 22	W	Thermoregulation	Kennedy	
	Nov. 24	F	Thanksgiving Holiday		
10 11	Nov. 27	M	Altitude and Exercise	Kennedy	No Lab
	Nov. 29	W	Ergogenic Aids	Kennedy	
	Exam Week Dec 4	M	Exam #3 (Nov. 8 – Nov. 29) - 9 lectures Exam 12/4/2017 10:30 to 12:30		