

University of Southern California – Department of Biological Sciences
Human Biology 420L - Applied Human Physiology (4 units), Spring 2019

Instructor: Kurt E. Kwast, Ph.D.

Office Hours: Monday 12:00 pm - 1:30 pm & Wednesday 12:30 pm – 2:00 pm (AHF B39)

Email: kwast@usc.edu

Lecture: MWF 9:00 - 9:50 am; THH 202

Course Description:

Exploration of the function of cells, tissues, organs, and organ systems with focus on the integration within and between the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, respiratory, immune, renal, digestive, and reproduction systems, and its application in human health and disease. *Course Prerequisite: BISC 220L; Suggested Course Prerequisite: HBIO 301*

Learning Objectives:

The primary objective of HBIO 420 is to ensure that students have a fundamental understanding of how the human body works.

- Students should be able to recognize, explain, and provide examples of homeostasis and the mechanism involved, including the roles of negative and positive feedback.
- Students should be able to identify structural components and explain the functional attributes of each of the body's organ systems as well as understand and demonstrate the interrelationships within and between them.
- Students should be able to model, interpret, explain, and predict the integrated responses of the organ systems to physiological and pathological stressors.
- Students should be able to explain and understand the pathophysiology of common diseases as well as use critical thinking skills to make real-world connections between life-style choices and homeostatic imbalances that comprise our current, global health crises.

I. Texts and On-line Access:

Required:

1. ***Human Physiology: An Integrated Approach***. 8th ed. Silverthorn. Pearson Publishing, New York, NY, 2016, with Modified Mastering A & P/ET VP A/C, 8/E, ISBN 9780134269221
2. ***Laboratory Manual for Applied Systems Physiology*** by Henige, K., and M. Matveyenko.

For Further Reading:

3. ***Exercise Physiology: Human Bioenergetics and Its Applications***. 4th edition, Brooks, G.A., Fahey, T.D., and K.M. Baldwin. McGraw-Hill Companies, New York, NY, 2005.

II. Grading Outline:

In-Class Assignments	50 pts.
Pre-Lecture & Homework Assignments	150 pts.
Midterm 1	120 pts.
Midterm 2	120 pts.
Midterm 3	120 pts.
Final Exam	190 pts.
Lab	<u>250 pts.</u>
TOTAL	1000 pts.
JEP Extra Credit	+25 pts.

- Individual exams and labs will be scored but not assigned a letter grade. Only the final point tally will be assigned a letter grade. The grading scale will be based on a traditional grading scale as follows:

Letter Grade	Point Ranges	Grade Point Value
A	930-1025	4.000
A-	900-929	3.667
B+	870-899	3.333
B	830-869	3.000
B-	800-829	2.667
C+	770-799	2.333
C	730-769	2.000
C-	700-729	1.667
D+	670-699	1.333
D	630-669	1.000
D-	600-629	0.667
F	<600	0.000

- A request to take a make-up exam must be accompanied by evidence of a university-sanctioned excused absence (i.e., a letter from a doctor, athletic release, etc.) and must be made before the date of the scheduled exam. Make-up exams may be different from the scheduled exam (e.g., essay) and may be proctored by personnel who do not have extensive knowledge in the area being tested.

III. Laboratory Component (PED B16):

Lab Director: Emi Embler, Ph.D. (eembler@usc.edu)

Lab Instructor: Tamara Espinet, Ed.D.

IV. Tentative Lecture Schedule:

Date	Lecture Topic	Silverthorn (8 th ed.)
Jan. 7	Introduction / Homeostasis	Ch. 1
Jan. 9	Bioenergetics & Cellular Metabolism	Ch. 1 - 4
Jan. 11	Bioenergetics & Membrane Physiology	Ch. 1 - 5
Jan. 14	Membrane Physiology	Ch. 5
Jan. 16	Endocrinology I: Hypothalamus and Pituitary	Ch. 7
Jan. 18	Endocrinology II: Hormones, Homeostasis & Pathology	Ch. 7
Jan. 21	MARTIN LUTHER KING JR HOLIDAY	
Jan. 23	Endocrinology II: Hypothalamus and Pituitary	Ch. 7
Jan. 25	Neurophysiology: Neurons	Ch. 8
Jan. 28	Neurophysiology: Neurons	Ch. 8
Jan. 30	Neurophysiology: Signal Transduction	Ch. 8
Feb. 1	Neurosensory Physiology	Ch. 10
Feb. 4	MIDTERM I	
Feb. 6	Muscle Physiology	Ch. 12
Feb. 8	Muscle Physiology	Ch. 12
Feb. 11	Muscle Bioenergetics and Force	Ch. 12
Feb. 13	Cardiovascular Physiology	Ch. 14
Feb. 15	Cardiovascular Physiology	Ch. 14
Feb. 18	PRESIDENT'S DAY HOLIDAY	

Feb. 20	Cardio- and Vascular-Dynamics	Ch. 15
Feb. 22	Regulation of Ventilation & Circulation	Ch. 16-18
Feb. 25	Regulation of Ventilation & Circulation	Ch. 16-18
Feb. 27	Regulation of Ventilation & Circulation	Ch. 16-18
Mar. 1	Renal Physiology	Ch. 19
Mar. 4	MIDTERM II	
Mar. 6	Renal Physiology	Ch. 19
Mar. 8	Fluid & Electrolyte Balance	Ch. 20
Mar. 10 - 17	SPRING BREAK	
Mar. 18	Fluid & Electrolyte Balance	Ch. 20
Mar. 20	Digestive Physiology	Ch. 21
Mar. 22	Digestive Physiology	Ch. 21
Mar. 25	Digestive Physiology	Ch. 21
Mar. 27	Homeostatic Control of Digestion and Metabolism	Ch. 22
Mar. 29	Metabolic Regulation and Control of Body Temperature	Ch. 22
Apr. 1	Advanced Endocrinology and Metabolic Control	Ch. 23
Apr. 3	Advanced Endocrinology	Ch. 23
Apr. 5	Immunology	Ch. 24
Apr. 8	MIDTERM III	
Apr. 10	Immunology	Ch. 24
Apr. 12	Physiology of Reproduction	Ch. 26
Apr. 15	Physiology of Reproduction	Ch. 26
Apr. 17	Exercise Physiology	Ch. 25
Apr. 19	Exercise Physiology	
Apr. 22	Physiology of Altitude: Hypobaria	
Apr. 24	Physiology of Altitude: Hypobaria & Exercise	
Apr. 26	Diving Physiology	
May 3	Semi-Comprehensive FINAL EXAMINATION 8:00 am – 10:00 am	

V. Relevant Human Biology BS & BA degree objectives addressed in part by this course):

- Students should develop a deeper comprehension of the central and cross-disciplinary concepts of human biology, which include bioenergetics, the interrelationship of human form and function, physiological homeostasis, and biomechanics.
- Students should develop proficiency in modern methodologies pertinent to research in biological and medical sciences.
- Students should be able to think critically, analyze, synthesize, and use information to solve real-world problems.
- Students should develop sufficient depth of knowledge and skill for graduate study in the health professions or other biology-related disciplines or entry-level employment in a wide variety of health-related fields.

VI. Academic Accommodations:

Any student requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (the instructor) as early in the semester as possible. DSP is located in Student Union (STU) 301 and is open 8:30 - 5:00pm Monday – Friday. The phone number for DSP is (213) 740-0776.

VII. Academic Integrity:

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the University. Since dishonesty in any form harms the individual, other students and the University, academic integrity policies will be strictly enforced. I expect you will familiarize yourself with the Academic Integrity guidelines found in the current SCampus.

VIII. Academic Integrity Violations:

- Academic dishonesty/misconduct (plagiarism, cheating, unauthorized collaboration, etc.) will not be tolerated. All academic integrity violations will result in a grade sanction and will be reported to the Office for Student Judicial Affairs. It is your responsibility to “reasonably” protect your own work from the plagiarism of others.
- If plagiarism is detected on a group project, all members of the group will be held responsible.
- You are expected to be familiar with the Academic Integrity guidelines found in the current SCampus (student guidebook). An electronic version is available at <http://usc.edu/scampus>.

IX. Disruptive and Threatening Student Behavior:

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students’ ability to learn and an instructor’s ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

X. Blackboard:

Notes will be periodically posted on blackboard. However, the information posted on blackboard is not the only material that will be on the exam. If you attend class regularly you will be updated on the status of lecture notes and course material/announcements.

XI. Electronic Devices:

Please turn off or disable all cell phones or other electronic communication devices during class time. Using a laptop in class to take lecture notes is permitted. However, please turn off your browser, email, messaging and any other programs that do not involve the course material.