

University of Southern California – Department of Biological Sciences
Human Biology 420L - Applied Human Physiology (4 units), Fall 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 10:00 - 10:50 am; SOS B46

Laboratory: PED B12

Course Description:

The physiology of the endocrine, nervous, musculoskeletal, respiratory, cardiovascular, renal, digestive, immune, and reproduction systems in humans, with application to human health and pathology. *Course Prerequisite: BISC 220L. Highly Recommended 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/Access (Required):

Required:

- 1) **Human Physiology: An Integrated Approach.** 8th Silverthorn. Pearson Publishing, New York, NY, 2019, 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	190 pts.
Lab	250 pts.
	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

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.)
Aug. 26	Introduction / Homeostasis	Ch. 1
Aug. 28	Bioenergetics & Cellular Metabolism	Ch. 1 - 4
Aug. 30	Bioenergetics & Membrane Physiology	Ch. 1 - 5
Sept. 2	LABOR DAY HOLIDAY	Ch. 5
Sept. 4	Membrane Physiology	Ch. 7
Sept. 6	Endocrinology I: Hypothalamus and Pituitary	Ch. 7
Sept. 9	Endocrinology II: Hormones, Homeostasis & Pathology	
Sept. 11	Endocrinology II: Hypothalamus and Pituitary	Ch. 7
Sept. 13	Neurophysiology: Neurons	Ch. 8
Sept. 16	Neurophysiology: Neurons	Ch. 8
Sept. 18	Neurophysiology: Signal Transduction	Ch. 8
Sept. 20	Neurosensory Physiology	Ch. 10
Sept. 23	Muscle Physiology	Ch. 12
Sept. 25	MIDTERM I	
Sept. 27	Muscle Physiology	Ch. 12
Sept. 30	Muscle Bioenergetics and Force	Ch. 12
Oct. 2	Cardiovascular Physiology	Ch. 14
Oct. 4	Cardiovascular Physiology	Ch. 14
Oct. 7	Cardio- and Vascular-Dynamics	Ch. 15
Oct. 9	Regulation of Ventilation & Circulation	Ch. 16-18
Oct. 11	Regulation of Ventilation & Circulation	Ch. 16-18
Oct. 14	Regulation of Ventilation & Circulation	Ch. 16-18
Oct. 16	Renal Physiology	Ch. 19
Oct. 17 - 20	FALL RECESS	

Oct. 21	Renal Physiology	Ch. 19
Oct. 23	Fluid & Electrolyte Balance	Ch. 20
Oct. 25	MIDTERM II	
Oct. 28	Digestive Physiology	Ch. 21
Oct. 30	Digestive Physiology	Ch. 21
Nov. 1	Digestive Physiology	Ch. 21
Nov. 4	Homeostatic Control of Digestion and Metabolism	Ch. 22
Nov. 6	Metabolic Regulation and Control of Body Temperature	Ch. 22
Nov. 8	Advanced Endocrinology and Metabolic Control	Ch. 23
Nov. 11	Advanced Endocrinology	Ch. 23
Nov. 13	Immunology	Ch. 24
Nov. 18	Immunology	Ch. 24
Nov. 20	Physiology of Reproduction	Ch. 26
Nov. 22	MIDTERM III (Ch. 14 – 21)	
Nov. 25	Physiology of Reproduction	Ch. 26
Nov. 27 – Dec. 1	THANKSGIVING BREAK	
Dec. 2	Exercise Physiology	Ch. 25
Dec. 4	Physiology of Altitude: Hypobaria	
Dec. 6	Diving Physiology	
Dec. 16	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 and Conduct:

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the University. Given that dishonesty in any form harms not only the individual but 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 (Student Handbook).

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.

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. 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.

X.I 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, I expect you to turn off your browser, email, messaging and any other programs that do not involve the course material.

XII. 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/sssa

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.