

HUMAN PHYSIOLOGY (BIOLOGY 2124), SPRING 2017

Instructor: Dr. Ari Berkowitz
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Textbook: *Principles of Human Physiology*, 4th-6th ed.
by C. L. Stanfield
Pearson

Classes: MWF 11:30 AM-12:20 PM
Adams Hall 150

Lab Manual: Available from Canvas (downloads)
or from Crimson and Cream Print Shop

Labs: Richards Hall 213

Student Response System (“clicker”): iclicker2

Office Hrs: Tu & W 2-4 PM (RH 102)
(or Action Center) Th 11:30 AM-1:30 PM (Wagner)
or by appointment

Web Site: <https://canvas.ou.edu>
(includes recorded lectures)

COURSE OBJECTIVES

After completing this course, you should be able to:

- 1) Describe the function(s) of each important structure in each organ system (including endocrine, nervous, muscular, cardiovascular, respiratory, immune, urinary, digestive, metabolic, and reproductive systems).
- 2) Explain, in terms of cause and effect, how the components of each organ system normally work together.
- 3) Predict how each function will be altered by specific perturbations of the internal or external environment.
- 4) Explain how specific interactions between systems can a) increase the probability of survival and/or reproduction or b) cause health problems.

GRADING

<u>Course component</u>	<u>Contribution to grade</u>
Exam #1.....	10%
Exam #2.....	10%
Exam #3.....	10%
Final exam (comprehensive)	18%
Class quizzes:	
Individual (11 quizzes; lowest 1 dropped)	4%
Group (11 quizzes; lowest 1 dropped)	4%
Individual online quizzes.....	4%
Group exercises	10%
Laboratory prep. work/quizzes (13; lowest 3 dropped).....	15%
Laboratory data collection (5)	12.5%
<u>Laboratory Biopac exercise</u>	<u>2.5%</u>
TOTAL.....	100%

Final course grades will be assigned objectively on the basis of total points earned:

- A = 90% or more
B = 80% or more, but less than 90%
C = 70% or more, but less than 80%
D = 60% or more, but less than 70%
F = less than 60%

Course grades will not be curved; instead, all scores on an individual exam *may* be scaled up (i.e., the same number of points added to each student’s score); the instructor alone will make this decision.

PLEASE NOTE

IN-CLASS QUIZZES WILL COVER MATERIAL FROM THE TEXTBOOK READINGS ASSIGNED FOR THAT DAY OR BEFORE. STUDENTS ARE EXPECTED TO DO THE TEXTBOOK READING FOR EACH DAY IN ADVANCE AND BE PREPARED FOR A QUIZ OVER IT. This will allow us to build on your textbook reading with more advanced exercises during class. Each in-class quiz will be taken a) individually *and* b) in your small group; *both* sets of answers will count towards your grade.

Online quizzes must be taken *individually*. These quizzes are timed, but you can take each one as many times as you like and only the highest score will count. Each time you take it, the questions will be somewhat different.

At the semester's end, your **group percentage correct** (i.e., 14% of your grade) will be adjusted up or down based on your own contribution to group efforts, assessed confidentially by each of the other members of your group.

Missed Laboratory Sessions: *There will be no make-up labs.* If you know in advance that you will be unable to attend your regular laboratory session due to a religious holiday or official university event, you must make arrangements with your laboratory instructor to attend another laboratory session that week.

Missed Exams or Quizzes: *There will be no make-up exams or quizzes.* At the semester's end, each student's lowest *single* individual class quiz score will be dropped; each group's lowest *single* class quiz score will be dropped. For missed exams, see Exam Score Substitution Policy below.

Exam Score Substitution Policy: The final exam will consist of 4 sections: 1 section for each of the 3 earlier parts of the course (corresponding to the 3 previous exams) and 1 section for the final portion of the course. If your percentage correct on any *one* of the first 3 sections of the final exam is higher than your percentage correct on the corresponding previous exam, the percentage correct on that final exam section will be substituted for the percentage correct on the previous exam. (If your percentage correct is higher on *more than one* final exam section than on the corresponding previous exam, only the score showing the biggest improvement will be substituted.) If you *miss* any one exam (other than the final exam) for any reason, the corresponding section of the final exam will serve as your percentage correct on the missed previous exam (and you will not be able to substitute a second final exam section for a second previous exam). If you miss a *second* exam, you will receive a zero for that exam score.

Grading Errors: If you believe there was an error in a quiz or exam or a mistake in grading, you must give the instructor a *written* description of the apparent mistake and your reasoning within one week of receiving the grade (e.g., by email). The instructor will decide on the complaint and inform the student *at a later time*.

Academic Misconduct: **Except for group quizzes and group exercises, all graded work should be that of the student alone.** Academic misconduct will be taken very seriously and university regulations will be followed (see <http://integrity.ou.edu>). *Taking a class quiz in place of an absent student or copying or "shared writing" of lab questions, quizzes, or data analysis exercises or other forms of cheating will not be tolerated.*

Students with Disabilities: If you have a disability that may prevent you from fully demonstrating your abilities, please contact the instructor and the Disability Resource Center (<http://www.ou.edu/drc.html>; 730 College Ave.; 325-3852) as soon as possible, to discuss accommodations necessary to ensure your full participation and to facilitate your educational opportunities.

Religious observances: It is the policy of the University of Oklahoma to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required classwork that may fall on religious holidays. If you will miss class for a religious observance, please notify me in advance so we can more easily make arrangements to accommodate your absence.

Cell phones must be turned off and put away out of view of both the student and instructor **during class and lab.** Laptops may be used during class only for note-taking. Laptops may *not* be used in lab.

Important Dates:

Last date for automatic W upon withdrawal without petition to dean: **March 31**

Final exam: **Thursday, May 11, 1:30-3:30 PM, Adams Hall 150**

HUMAN PHYSIOLOGY CLASS SCHEDULE

WEEK	DATE	TOPIC	TEXTBOOK READING (<i>BEFORE</i> class)	LECTURES
	1/18	Introduction		
1	1/20	Control mechanisms, biomolecules, & cells	pp. 1-12, 616-618, & Ch. 2 (esp. 18-33)	1A, 1B
	1/23	How molecules bind and act: enzymes, receptors, etc.	Ch. 3 (esp. 65-72) & Ch. 5: 134-136	1C
2	1/25	Cellular respiration; molecular transport	Ch. 3: 72-89 & Ch. 4 (esp. 94-112)	2A, 2B
	1/27	Chemical messengers, including hormones	Ch. 5 & Ch. 6 (esp. 149-153)	2C
	1/30	Resting potentials	Ch. 7: 167-182	3A
3	2/1	Action potentials	Ch. 7: 182-193	3B
	2/3	Synapses: mechanisms	Ch. 8: 197-203	3C, 3D
	2/6	Synapses: neurotransmitters & integration	Ch. 8: 203-212	4A
4	2/8	Nervous system anatomy; autonomic nervous system	pp. 216-235 & 304-315	4B, 4C
	2/10	Sensory systems: overview & somatosensory	Ch. 10: 254-269	4D
	2/13	Sensory systems: vision	Ch. 10: 269-284	5A
5	2/15	Sensory systems: hearing, vestibular, chemical senses	Ch. 10: 285-299	5B, 5C, 5D
	2/17	Reflexes/movement control & cognitive functions	pp. 236-250, 315-319, & 349-350	5E, 5F
	2/20	EXAM #1: Molecular/Cellular Basics + Endocrine/Nervous Systems		
6	2/22	Muscles: mechanism of contraction	Ch. 12: 323-340	6A, 6B, 6C
	2/24	Muscles: energetics & smooth/cardiac muscles	Ch. 12: 340-355 (esp. 343-346)	6D
	2/27	Blood composition and hemostasis	Ch. 15	7-8A, 7-8B
7	3/1	Heart function	Ch. 13: 360-382	7-8C, D, E, & F
	3/3	Regulation of cardiac output	Ch. 13: 382-390	7-8G
	3/6	Regulation of blood flow through vessels	Ch. 14	7-8H
8	3/8	Cardiovascular system during exercise & disorders	Ch. 14: 422-429	7-8I
	3/10	Immune system: overview & nonspecific system	Ch. 23: 669-681	8-9A, 8-9B
	3/11-3/19 SPRING VACATION-NO CLASS!!			
	3/20	Immune system: specific system	Ch. 23: 681-694	8-9C, 8-9D, 8-9E
9	3/22	Immune system: tolerance, allergies, autoimmunity	Ch. 23: 684-685 & 694-697	8-9F
	3/24	Respiration: mechanism of breathing	Ch. 16	10A, 10B
	3/27	EXAM #2: Muscles + Cardiovascular & Immune systems		
10	3/29	Respiration: gas exchange	Ch. 17: 474-488	10C
	3/31	Respiration: regulation	Ch. 17: 489-499	10D
	4/3	Urinary system: anatomy and basic functions	Ch. 18 (esp. 504-520)	11A, 11B
11	4/5	Urinary system: reabsorption / secretion mechanisms	Ch. 19 (esp. 536-541 & 543-545)	11C, 11D, 11E
	4/7	Urinary system: regulation & micturition	pp. 525-527, 541-543, & 545-549	11F, 11G, 11H
	4/10	Gastrointestinal: anatomy, overview, & motility	Ch. 20: 566-578 & 594-599	12-13A, 12-13B
12	4/12	Gastrointestinal: digestion	Ch. 20: 578-584	12-13C
	4/14	Gastrointestinal: absorption	Ch. 20: 585-594	12-13D
	4/17	Regulation of metabolism and calcium	pp. 84-89, 549-551, 603-616, & 624-627	12-13E, 12-13F
13	4/19	Reproduction: embryonic development, anatomy	Ch. 22: 632-641 & 645-649	14A, 14B
	4/21	Reproduction: hormonal regulation	Ch. 22: 641-645 & 649-655	14C, 14D,
	4/24	EXAM #3: Respiratory, Urinary, & GI Systems		
14	4/26	Reproduction: pregnancy, labor, & lactation	Ch. 22: 655-664	14E, 14F
	4/28	Catch-up or review		
	5/1	Catch-up or review		
15	5/3	Catch-up or review		
	5/5	Review		
	5/11	FINAL EXAM: 1:30-3:30 PM: COMPREHENSIVE		

Note: This schedule is tentative and may be changed by the instructor as needed.

Laboratory Sessions

The goal of the laboratory session is to give you an understanding and appreciation of human physiology that goes beyond “book-learning,” by doing hands-on experiments that deal with principles discussed in class. Lab attendance is required (refer to page 2 of this syllabus for course policy).

Given the course topic, students are the best subjects for many laboratory exercises. Therefore, we will be asking for student volunteers to participate in various exercises throughout the semester. All experiments on human subjects are non-invasive and only mildly stressful. The welfare and comfort of the human subjects are always more important than the “success” of the exercise. We invite students to be volunteer subjects, but not volunteering for an exercise will not hurt a student’s grade. Although humans are the best subjects for many of the lab exercises, we cannot investigate some physiological processes non-invasively. Therefore, a few of the labs utilize frogs. Because physiology is the study of living tissues and organ systems, there is no adequate substitute for the use of animals in these labs. These animals are always treated humanely, but some labs require that the instructors (NOT the students) euthanize the animals before the experiments.

DISCLAIMER: Please note that our physiology lab equipment is intended for use in a teaching environment. Equipment is NOT to be used as a medical device. None of our equipment is intended to diagnose, treat, or monitor your health. If you should become concerned as a result of a physiology lab activity, please consult a medical professional. Class lab activities are not intended for the prevention, cure, or alleviation of disease, injury, or disability.

Laboratory exercises will be conducted in groups. Collaborative learning is a strategy for improving your efficiency and success on learning tasks that can be done in groups. It includes a division of labor on the task and specific roles for each student. Designed for tasks in which students are active learners (learning by doing, rather than by listening passively), collaborative learning encourages sharing and mutual help, rather than competition. Your laboratory groups will be randomly determined during the first or second week of lab. If a situation arises that requires rearrangement, contact your TA immediately. Individuals or the entire lab may be rearranged at the TA’s discretion. All group members should obtain and work from the same data.

Each team will receive the materials necessary for each week’s lab exercises. These materials must be returned clean and intact at the end of the lab session. Breakage will be charged to the person responsible if he/she can be identified; otherwise, the entire team to which the material was assigned will share its cost.

Eating, drinking, smoking, and chewing tobacco are not allowed in the laboratory. Close-toed shoes are required! You should wash your hands thoroughly with soap and water after each laboratory session and before touching food, drinks, or cigarettes. Children are NOT permitted in the labs. Safety goggles will be provided when necessary. Additional laboratory safety rules will be covered during the first week of lab. Any student whose behavior presents a safety hazard to themselves or other students will be removed from lab and will receive a zero score for that week’s lab activities.

To be prepared and successful in lab, please follow these important steps:

STEP 1: Before coming to lab: It is very important to come to lab prepared!

- 1) Read/review the designated portions of the textbook.
- 2) Read thoroughly the background information and procedures in the lab manual (either purchased from Crimson and Cream print shop or downloaded each week from Canvas)

STEP 2: During Lab

- 1) Follow the procedures in the laboratory worksheet and work efficiently as a group.
- 2) You will work as a group to collect the data but everyone needs to answer all the questions in **their own words** and record data on their own printed hardcopies.
- 3) If graphs are required, make your graphs in Excel and print them in lab to include in your own data collections.
- 4) Take full advantage of your instructors during each lab period by asking questions. Leaving with a firm understanding of concepts and experiments is a great way to prepare for quizzes.

STEP 3: After Lab

- 1) Be sure you have completed the entire lab (i.e., thoroughly answered all questions, made and included all Excel graphs etc.).
- 2) Study for the in-lab quiz to be held during the next laboratory session. In-lab quizzes cover material from pre-readings (STEP1, #2), as well as material from the previous week's lab.

**HUMAN PHYSIOLOGY
LABORATORY SCHEDULE
SPRING 2017**

Week	Dates	Laboratory	Textbook Reading
1	1/17 - 1/20	NO LABS	
2	1/23 - 1/27	Introduction Lab Safety / Scientific Methods	
3	1/30 - 2/3	Endocrine Physiology (Make sure to bring your textbook to lab)	Chapter 6 + pp. 611-614
4	2/6 - 2/10	Action Potential Simulations	Chapter 7
5	2/13 - 2/17	Laboratory Data Collection #1 Synapse Simulations	Chapter 8
6	2/20 - 2/24	Human Senses	Chapter 10
7	2/27 - 3/3	Human Reflexes, EMGs, & Biomechanics	Biopac exercise pp. 236-242, 315-319, & 347-350
8	3/6 - 3/10	Laboratory Data Collection #2 Skeletal Muscle Physiology	Chapter 12
	3/13 - 3/17	SPRING BREAK	
9	3/20 - 3/24	Human Cardiovascular Physiology	Chapters 13-14
10	3/27 - 3/31	Laboratory Data Collection #3 Heart Mechanisms	Chapter 13
11	4/3 - 4/7	Blood/Immune System	Chapters 15 & 23
12	4/10 - 4/14	Laboratory Data Collection #4 Respiratory Physiology	Chapters 16-17
13	4/17 - 4/21	Urinary System Physiology	Chapters 18-19
14	4/24 - 4/28	Digestive Physiology	Chapter 20
15	5/1 - 5/5	Laboratory Data Collection #5 Wrap-up	