

## BISC 307 (General Physiology), Spring 2019

Date	Day	Topic	Silverthorn – 8 <sup>th</sup> Ed.	Quizzes*
Jan 7	M	01 Introduction	Ch 1, Ch 6 (181-190)	
Jan 9	W	02 Evolutionary Perspectives 1	See Blackboard for resources	
Jan 11	F	03 Evolutionary Perspectives 2	See Blackboard for resources	Quiz 1
Jan 14	M	04 Membrane Dynamics	Ch 5	
Jan 16	W	05 Cellular Communication	Ch 6 (164-181)	
Jan 18	F	06 Electrical Signals 1	Ch 8 (224-249)	Quiz 2
Jan 21	M	<i>Holiday (MLK Day)</i>	-----	
Jan 23	W	07 Electrical Signals 2	Ch 8 (224-249)	
Jan 25	F	08 Action Potentials 1**	Ch 8 (224-249)	Quiz 3
Jan 28	M	09 Action Potentials 2	Ch 8 (224-249)	
Jan 30	W	10 Synaptic Transmission 1	Ch 8 (249-265)	
Feb 1	F	11 Synaptic Transmission 2	Ch 8 (249-265), Ch 11 (355-368)	Quiz 4
Feb 4	M	<b>EXAM 1</b>	Jan 7 through Jan 30 (10 lects)	
Feb 6	W	12 Skeletal Muscle 1	Ch 11 (368-372), Ch 12 (374-400)	
Feb 8	F	13 Skeletal Muscle 2	Ch 12 (374-400)	Quiz 5
Feb 11	M	14 Skeletal Muscle 3	Ch 12 (374-400)	
Feb 13	W	15 Smooth Muscle	Ch 12 (400-409)	
Feb 15	F	16 Regulation of Metabolic Fuel 1	Ch 22 (692-719)	Quiz 6
Feb 18	M	<i>Holiday (President's Day)</i>	-----	
Feb 20	W	17 Regulation of Metabolic Fuel 2	Ch 22 (692-719)	
Feb 22	F	18 Adrenal Glucocorticoids 1***	Ch 7, Ch 23 (728-734)	Quiz 7
Feb 25	M	19 Adrenal Glucocorticoids 2	Ch 7, Ch 23 (728-734)	
Feb 27	W	20 Thyroid, Growth Hormone	Ch 23 (734-741)	
Mar 1	F	21 Calcium Balance	Ch 23 (741-751)	Quiz 8
Mar 4	M	<b>EXAM 2</b>	Feb 1 through Feb 27 (10 lects)	
Mar 6	W	22 Reproduction 1	Ch 26 (800-815)	
Mar 8	F	23 Reproduction 2	Ch 26 (815-836)	Quiz 9
Mar 11	M	<i>Spring Break</i>	-----	
Mar 13	W	<i>Spring Break</i>	-----	
Mar 15	F	<i>Spring Break</i>	-----	-----
Mar 18	M	24 Cardiovascular System 1	Ch 14 (432-452)	
Mar 20	W	25 Cardiovascular System 2	Ch 14 (432-452)	
Mar 22	F	26 Heart as a Pump 1	Ch 14 (452-474)	Quiz 10
Mar 25	M	27 Heart as a Pump 2	Ch 14 (452-474)	
Mar 27	W	28 Heart as a Pump 3	Ch 14 (452-474)	
Mar 29	F	29 Blood Vessels & Pressure	Ch 15 (476-489)	Quiz 11
Apr 1	M	30 Distribution of Blood	Ch 15 (489-506)	
Apr 3	W	31 Blood	Ch 16	
Apr 5	F	<b>EXAM 3****</b>	Mar 1 through Apr 1 (10 lects)	Quiz 12
Apr 8	M	32 Respiratory System 1	Ch 17	
Apr 10	W	33 Respiratory System 2	Ch 18	
Apr 12	F	34 Respiratory System 3	Ch 18	Quiz 13
Apr 15	M	35 Kidney Function & Filtration 1	Ch 19 (587-600)	
Apr 17	W	36 Kidney Function & Filtration 2	Ch 19 (587-600)	
Apr 19	F	37 Tubular Reabsorption & Secretion	Ch 19 (600-615)	Quiz 14
Apr 22	M	38 Water & Salt Balance 1	Ch 20 (618-636)	
Apr 24	W	39 Water & Salt Balance 2	Ch 20 (618-636)	
Apr 26	F	40 Volume, Osmolarity, Acid-Base Balance	Ch 20 (636-652)	-----
May 1	W	<b>EXAM 4, 2:00 – 4:00 pm</b>	Apr 3 through Apr 26 (10 lects)	

\* Quizzes are distributed via Blackboard by 5 pm on indicated Fridays, and are due the following Tuesday by 10 am.

\*\* Friday, January 25 is the last day to drop without a mark of "W" and with tuition refund.

\*\*\* Friday, February 22 is the last day to drop without a mark of "W" and without tuition refund.

\*\*\*\* Friday, April 5 is the last day to drop with a mark of "W".

## A. General Course Description and Policies

### Catalog Description

BISC 307L General Physiology (4 units, Spring semester only) Physiological functions of the circulatory, endocrine, integumentary, musculoskeletal, nervous, respiratory, and urogenital systems of animals. Lecture, 3 hours; laboratory, 3 hours. Prerequisite: BISC 220L or BISC 221L.

### Overview

Physiology is unique among the biomedical sciences in its focus on the functions of intact, living organisms. It is especially concerned with homeostasis, which refers to regulation of conditions inside the body within the narrow limits that are compatible with life. This course will cover the physiology of human cells, tissues, organs, and organ systems, with emphasis on mechanisms by which homeostasis is maintained, and on the integration of each system with other systems. Evolution is emphasized as a unifying concept.

### Instructor

Albert Herrera, HNB 116, 213-740-9177, aherrera@dornsife.usc.edu

### Laboratory Manager

Dr. Michael Moore, ZHS 371B, 213-740-6084, moore@dornsife.usc.edu

### Laboratory Instructors

TBD

### Textbooks

- *Human Physiology: An Integrated Approach*, by Dee Unglaub Silverthorn, 8<sup>th</sup> edition.  
*Note:* Reading assignments are given for the 8<sup>th</sup> edition, but that edition is not substantially different from the previous (7<sup>th</sup>) edition. Students interested in saving money may opt for the older version. Corresponding reading assignments for the 7<sup>th</sup> edition will be posted on Blackboard (see Course Documents). Users of the 7<sup>th</sup> edition should consult the 8<sup>th</sup> edition to check for differences. Copies of the 8<sup>th</sup> and 7<sup>th</sup> editions will be available for use in ZHS 360A.

### Blackboard (<https://blackboard.usc.edu/>)

- All course materials, information, recordings, quizzes, and grades will be posted on Blackboard until Commencement Day. We will also make extensive use of Blackboard discussion forums, as will be explained in lecture. Blackboard is to be used only for appropriate, course-related activities. Inappropriate use of Blackboard and other electronic resources may result in disciplinary action (see Academic Integrity section below, p. 6).

### Lecture

MWF 1:00-1:50 pm, THH 101, class no. 13018R

- Lectures will be recorded and made available as streaming video and downloadable audio files. Links to the video server and the audio files will be posted in Blackboard. These recordings will focus on the projected slides and the lecturer, but students in lectures and Q&A sessions (see below) should be aware that they may be incidentally recorded, especially if they sit toward the front of the room.
- For some topics, basic or introductory material will be presented via short, pre-recorded video lectures. When we meet in class, we can then use the lecture time to discuss more advanced aspects of the topic. So, it is important that you view and understand the pre-recorded lectures before coming to class. This approach will also free up lecture time for interactive problem-solving, discussion of applications, and

analysis of recent research – activities that will help you prepare for the lecture exams. Not every topic will follow this approach. Some topics will be covered entirely by traditional lectures.

- *Important Advice:* Please do not use the lecture recordings as a substitute for regular attendance at lecture or as an excuse to procrastinate. In the past, students who earned the highest grades were those who attended nearly every lecture and took careful notes. Shortly after each lecture, use the recordings to fill gaps in your notes and to focus on the more difficult material. In this way, you will keep up with the lecture schedule and be able to use the time just before exams to practice applying your knowledge to solve novel problems. Be creative in your use of these recordings. For example, keep track of the approximate elapsed time during the lecture, so you can note the timing of material you need to review. Try viewing the video recordings in small groups, so you can pause and discuss the material as you proceed. Take advantage of the portability of the audio recordings. Download them to your phone, computer, or other mp3 player and look for opportunities to listen when you are not otherwise occupied with mindful tasks. Speed up the playback or better yet, slow it down!

### Laboratory

- See Part B below for the complete laboratory syllabus.

### Lecture Exams

Exam 1: Monday, Feb 4, 1:00-1:55 pm

Exam 2: Monday, Mar 4, 1:00-1:55 pm

Exam 3: Friday, Apr 5, 1:00-1:55 pm

Exam 4: Wednesday, May 1, 2:00-4:00 pm

*Students may turn in their completed exam and leave when they wish. However, students who arrive late, after the first student has left the exam room, will not be allowed to start the exam. Such late-arrivers will receive a score of zero.*

- Exams will consist mostly of objective questions (e.g., multiple choice, true-false, etc.), with a few short-answer essay questions. Lecture exams cover lecture subjects only; laboratory subjects will not be covered. Lecture exams are not cumulative; each of the four exams will be worth the same number of points and will cover one quarter of the course, or 10 lectures, as specified in the Lecture Schedule. There will not be a comprehensive final. Exam 4 will be given at the scheduled time of the final but will cover only the last quarter of the course.
- Thoroughly memorizing and understanding the terms and concepts are essential. However, this level of learning will leave you only about half-prepared for the lecture exams. On exams, you will be required to **apply** what you learned to solve novel problems, many of which will pertain to situations that we never specifically discussed. Students find this approach very challenging but when they master it, as most of you will, the level of satisfaction is high. Even better, you will likely discover that you learned more than you thought you would. We will not ask more of you than you can handle, if you are willing to work hard. Please see the next section (Lecture Quizzes) for additional comments on exam questions.

### Lecture Quizzes

- Fourteen quizzes will be administered via Blackboard. The quizzes will be posted by 5 pm on Fridays and must be completed by 10 am on the following Tuesday. Questions will cover the lecture material discussed on the previous Friday, Monday, and Wednesday (see the table below for specific coverage). Each quiz will consist of 4 questions, worth 0.5 points each. Question types will be multiple choice, true/false, or short answer. To allow students to miss two quizzes for any reason, and to excuse uncharacteristically low scores, only the highest 12 scores will be counted toward the final grade. Therefore, a maximum of 24 points can be earned from the quizzes, or 4 % of the total course grade. No accommodations will be made for students who take fewer than 12 quizzes. Quiz answers will be posted at the 10 am Tuesday deadline. You will likely find it helpful to discuss the quiz questions and answers at the Q&A sessions on Tuesdays and Fridays (see below).
- My intention is to make the quiz questions as challenging as those that will appear on the more point-heavy exams. To do well in this course, it will not be sufficient to merely look up or memorize answers. You must also be able to apply your knowledge to solve novel thought problems. The quizzes are designed to give you low-stakes practice at this and to gauge your level of preparation for exams. This

will only work, however, if you take the quizzes seriously and responsibly. You may consult your textbook and any other printed or electronic material. You may also discuss the quiz questions with fellow students, if those discussions focus on understanding the underlying principles. You should not simply share or reveal your answers to other students, nor try to obtain answers from current or former students, for several reasons. First, you will not know until after the deadline whether your answer is correct. Second, you may deprive a fellow student of a learning opportunity. Third, you will diminish your own chances for a better grade by broadcasting your hard-won answers. Fourth, quiz questions are revised regularly, usually with the goal of making them more challenging. Each quiz is worth only 0.3% of the course grade, but its potential value as a learning tool is much greater. The quizzes will require a disproportionately large amount of effort – on my part to craft challenging questions, and on your part to discern and understand the correct answers. It is likely that students who cheat by merely copying other students' quiz answers will pay a price on exam days. Please don't be one of those students. In the 12 years since we introduced the quizzes, students have come to see them as one of the most challenging parts of the course, but also one of the most valuable. If you take the quizzes seriously, we think you will come to the same conclusion.

- The following table summarizes important information about the quizzes.

Quiz No.	Posted by 5 pm on Fri	Deadline 10 am on Tues	Lectures Covered
1	Jan 11	Jan 15	1, 2
2	Jan 18	Jan 22	3, 4
3	Jan 25	Jan 29	5, 6, 7
4	Feb 1	Feb 5	8, 9, 10
5	Feb 8	Feb 12	11, 12
6	Feb 15	Feb 19	13, 14
7	Feb 22	Feb 26	15, 16, 17
8	Mar 1	Mar 5	18, 19, 20
9	Mar 8	Mar 19	21, 22
10	Mar 22	Mar 26	23, 24, 25
11	Mar 29	Apr 2	26, 27, 28
12	Apr 5	Apr 9	29, 30, 31
13	Apr 12	Apr 16	32, 33
14	Apr 19	Apr 23	34, 35, 36

### Twice Weekly Question & Answer Sessions

- Dr. Herrera will hold Q&A sessions at the following times and places.  
Tuesdays, 12:00-12:50 pm, HNB 120F  
Fridays, 2:00-2:50 pm, HNB 120F (no Friday Q&A session on Apr 5)
- Q&A sessions will be recorded and made available as streaming video and downloadable audio podcasts. Links to the recordings will be posted in Blackboard.

### Instructor Office Hours

Please contact Dr. Herrera directly for office hour appointments. Office hours are intended for discussion of individual, confidential matters such as grades, personal problems that affect class performance, etc. Course subject matter and other public issues should be discussed in the Q&A sessions, so that all students can benefit from the interchange. The Lab Manager, Dr. Moore, will be generally available in his office, which is adjacent to the laboratory, during normal working hours. Laboratory Instructors will announce their office hours in their lab sections.

## Grading

- Grades will be based on the total number of points earned on exams, online quizzes and laboratory work, as shown in the table below. After each exam, a curve and table will be posted that shows the letter grades that correspond to current point totals.

Portion	Item	Pts Each	Number	Total	Portion Totals
Lecture	Exams 1-4	94	4	376	Lecture = 400 pts
	Online Quizzes	2	14	24*	
Laboratory	Presentation	35	1	35	Lab = 200 pts
	Presentation participation	5	1	5	
	Short Lab Report 1	15	1	15	
	Short Lab Report 2	15	1	15	
	Short Lab Report 3	15	1	15	
	Full Lab Report	50	1	50	
	Frog Lab Exercise	50	1	50	
	General Participation	---	---	15	
*Only the highest 12 quiz scores will count.					Course total = 600 pts

- Final letter grades will be determined by the following scheme. The mean point total of the top 10% of students will be determined. Students who earn a certain high percentage of that mean will earn an A or A-. Students whose totals fall below the A- level but above a certain lower percentage will earn a B+, B, or B-. Students below the B- level but above an even lower percentage will earn a C+, C, or C-, etc.
- An important consequence of this scheme is that, for the most part, grading is not competitive in this class. There are not fixed numbers of As and Bs to be assigned. The more the point totals are skewed (cluster) toward high values, the more As and Bs will be assigned.***
- This scheme was devised to facilitate cooperative learning and peer instruction.* High-achieving students should help others; doing so will not jeopardize their high grades. By teaching others, students will solidify their own understanding. Methods for accomplishing this will be discussed.

## Exam Policies

- Re-grading:** Answers to lecture exam questions will be posted on Blackboard shortly after each exam. Corrected exams will be handed back during your lab period. If you feel an error was made in the grading of your exam, you should make your case in writing on separate sheets of paper. Specify which questions you think were incorrectly graded and why. Give these sheets and your exam to your TA *before you leave the lab*. Exams taken from the lab will not be re-graded. The entire answer of each indicated question will be re-graded, not just the part you think deserves more credit. In addition, instructors will review the entire exam to check for errors in grading. Your score may increase or decrease as a result of this re-examination.
- Missed Exams:** *No make-up exams will be given.* Students who are unable to take an exam at the schedule time must contact Dr. Herrera as soon as possible, preferably in advance. If the student has a valid, well-documented reason for missing the exam, a score equal to the average of the other 3 exams will be assigned. Such an adjustment can be made for only one exam. Students who are ill and miss a regularly scheduled lecture or laboratory exam must see a doctor to document their illness. Within 48 hours of the missed exam, you must provide, in writing, the following information: 1) your doctor's name and telephone number, and 2) a statement signed by you authorizing us to discuss the situation with your doctor. We will contact your doctor and ask her or him whether you were too ill to take the exam. Note that neither you nor the doctor need tell us the nature of your illness. Simply visiting the Engemann Student Health Center or another medical facility will not be considered a valid medical excuse. Similarly, if an emergency prevents you from taking an exam, you must provide convincing

documentation of the emergency. If your excuse is judged not to be valid, or you do not provide it within the allotted time, you receive a score of zero for the missed exam.

- Missing Exam 4: If you miss Exam 4 and you provide a valid medical excuse or proof of emergency within 48 hours after the scheduled exam time, a course grade of Incomplete (IN) will be assigned. It will be your responsibility to contact Dr. Herrera to make arrangements for completing the course and replacing the IN with the grade you earned. You have a year to complete the requirements for removal of an IN. After this, your grade will change to an IX (Lapsed Incomplete) which counts as an F in the GPA. If you miss Exam 4 and do not submit a valid excuse, a course grade will be calculated based on your other scores and a zero for Exam 4.

### Academic Integrity

- Our university depends on honesty, integrity, and ethical behavior among its members. For students, ethical behavior includes respecting the intellectual property of others, submitting individual work unless otherwise directed by the instructor, protecting one's own academic work from misuse by others, and avoiding the use of another's work as one's own. There are well-defined standards for the ethical behavior of instructors as well.
- We have reliable, time-tested methods for detecting cheating, plagiarism, and other violations of academic integrity. Please note that to protect the integrity of grades and the academic process, sanctions for violations are severe. The minimum sanction is usually an F for the course. Suspension or expulsion from the university is also possible.
- Here is a partial list of actual violations that have been perpetrated by students in Dr. Herrera's classes in recent years. The numbers in parentheses refer to relevant paragraphs in the University Governance section of SCampus (see resource #5 below).
  1. Copying answers from other students during lecture or lab exams. (11.13)
  2. Submitting lab reports containing substantial portions plagiarized from other students. (11.11, 11.12)
  3. Use of Blackboard resources for commercial gain (11.19)
  4. Selling class notes and material downloaded from Blackboard to a web-based company that re-sells such material. (11.12B)
  5. Re-submission of a lab report written by the same student in an earlier semester. (11.16)
  6. Altering answers on a graded exam and submitting the altered exam for re-grading. (11.13B)
  7. Continuing to write answers on an exam after time has been called. (11.21)
  8. Unauthorized use of personal electronic devices, e.g., smartphones, during exams. (11.13)
  9. Students using multiple clickers to gain participation points for non-attending students. (11.18)

*- All of these offenses were serious and resulted in disciplinary action. Do not attempt any of these!*
- Resources on academic integrity standards, policies, and expectations:
  1. Trojan Integrity Guide: <http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf>
  2. Guide for Avoiding Plagiarism: <http://www.usc.edu/student-affairs/SJACS/forms/tig.pdf>
  3. Overview of Academic Integrity: <http://www.usc.edu/student-affairs/SJACS/forms/AcademicIntegrityOverview.pdf>
  4. Tutorial on Academic Integrity: [http://www.usc.edu/libraries/about/reference/tutorials/academic\\_integrity/index.php](http://www.usc.edu/libraries/about/reference/tutorials/academic_integrity/index.php)
  5. SCampus (University Governance, paragraph 11): <http://web-app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/>
  6. Scientific Misconduct: <http://policy.usc.edu/scientific-misconduct/>

### Other Conduct Issues

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* (<http://equity.usc.edu/>) or to the *Department of Public Safety* (<http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>). Call DPS at 213-740-4321 if you need immediate assistance or to

report a crime. Reporting such incidents is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Title IX webpage (<https://titleix.usc.edu/>) describes reporting options and other resources. Another website that discusses misconduct perpetrated or experienced by students, resources that can help, and reporting options is <https://policy.usc.edu/student/student-misconduct/>.

### **Students with Disabilities**

Any student requesting academic accommodations based on a disability is required to register with the Office of Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP and should be delivered to Dr. Moore early in the semester, *at least two weeks before Exam 1*. If a student's approved accommodation is limited to extra time on examinations, the teaching staff of BISC 307 will provide the accommodation. For any other accommodation, such as a private room, readers, translator, scribe, etc., students must make arrangements with the DSP office at least 2 weeks before each exam date. For more information, you can visit the DSP office in GFS 120 (8:30-4:30, M-F), call at 213-740-0776, email at [ability@usc.edu](mailto:ability@usc.edu), or go to their website: <https://dsp.usc.edu>.

### **Policies Concerning Student-Athletes**

Student-athletes may not be penalized when University-sanctioned competitions conflict with course activities or examinations. When a class will be missed for a sanctioned competition, it is the student-athlete's responsibility to approach the instructor in advance. The student must provide the instructor with an Excused Absence Letter from Student-Athlete Academic Services (SAAS). Information about such letters can be found on the SAAS website (<https://saas.usc.edu/>). The letter must certify that the student-athlete is participating in a University-sponsored event that deserves accommodation. Accommodations will not be made for other types of conflicting events. More information on the University's policy on student-athletes can be found at [https://www.provost.usc.edu/oaaaa\\_guidelines/](https://www.provost.usc.edu/oaaaa_guidelines/). Arrangements for the accommodation must be agreed upon in advance of the event. If multiple team members will be absent, each must make an individual arrangement with the instructor. If an assignment is due on the date when class is missed, the instructor may require that it be turned in before the missed class or at the first class meeting after the student returns. If a test has been scheduled for the date when class is missed, the instructor may arrange with SAAS to have the test administered by an academically qualified proctor (not a coach) during the trip. Alternatively, the instructor may agree to pro-rate the exam score, i.e., substitute the missing exam score with a score based on the average of the student's scores for the other exams compared to the class average for those exams.

### **Email Communication**

To ensure privacy, only students' USC accounts (*usc.edu* domain name) can be used for email communications regarding confidential matters. Other email accounts cannot be used. Students are responsible for understanding the content of official messages that instructors send to their USC accounts, and so should check their USC email regularly.

### **Emergency Preparedness / Course Continuity**

If an officially declared emergency makes travel to campus infeasible, USC Emergency Information (<http://emergency.usc.edu/> or 213-740-9233) will provide information related to safety and course continuity. We expect that instruction will be continued by means of Blackboard, teleconferencing, video/audio recording, and other technologies. Alternative assignments may be given if classes are canceled for prolonged periods. If you have not already done so, please register with TrojansAlert and/or download the mobile safety app to facilitate communication during emergencies. These resources can be found at <https://emergency.usc.edu/>.

## B. Laboratory

### Lab Schedule

Wk	Dates	Day	Exercises	Comments
1	Jan 8 ↓ Jan 11	Tu ↓ Fri	NO LAB MEETING THIS WEEK	
2	Jan 15 ↓ Jan 18	Tu ↓ Fri	Introduction to Lab	Safety issues; Discussion of Group Presentations; Discussion of Lab Reports & Teaching Exercise
3	Jan 22 ↓ Jan 25	Tu ↓ Fri	<i>No lab this week</i>	
4	Jan 29 ↓ Feb 1	Tu ↓ Fri	Group Presentations	PowerPoint presentations & discussion of classic scientific papers
5	Feb 5 ↓ Feb 8	Tu ↓ Fri	Cardiovascular Physiology (Human)	
6	Feb 12 ↓ Feb 15	Tu ↓ Fri	Skeletal Muscle Contraction (Human)	Subject of Short Lab Report 1 (due week of Feb 20-23)
7	Feb 19 ↓ Feb 22	Tu ↓ Fri	Lung Function – Spirometry (Human) Submit Short Lab Report 1	Subject of Short Lab Report 2 (due week of Feb 27-Mar 2)
8	Feb 26 ↓ Mar 1	Tu ↓ Fri	Kidney Function – Urinalysis (Human) Submit Short Lab Report 2	Subject of Short Lab Report 3 (due week of Mar 6-Mar 9)
9	Mar 5 ↓ Mar 8	Tu ↓ Fri	Plan, discuss, and submit proposal (within 48 h) for human experiments for Full Lab Report; Submit Short Lab Report 3	
10	Mar 12 ↓ Mar 15	Tu ↓ Fri	<i>Spring Break Week</i>	
11	Mar 19 ↓ Mar 22	Tu ↓ Fri	Experiments for Full Lab Report	Each group performs its own experiments
12	Mar 26 ↓ Mar 29	Tu ↓ Fri	Experiments for Full Lab Report	Each group performs its own experiments
13	Apr 2 ↓ Apr 5	Tu ↓ Fri	Nerve Conduction, Skeletal Muscle Contraction, Heart Function (Frog)	
14	Apr 9 ↓ Apr 12	Tu ↓ Fri	Plan, discuss, and submit proposal (within 48 h) for Frog Exercise Submit Full Lab Report	Full Lab Report Due
15	Apr 16 ↓ Apr 19	Tu ↓ Fri	Experiments for Frog Exercise	Each group performs its own experiments
16	Apr 23 ↓ Apr 26	Tu ↓ Fri	Consult with your TA on analyses, literature searches, and writing for Frog Exercise	Attendance is not mandatory but is highly recommended.
17	Apr 29	Mon		Frog Exercise due by noon



## Goals of the Laboratory

The laboratory is an integral and essential component of the course, with 3 main goals:

1. Give you hands-on experience with the processes, tissues, and concepts discussed in the lecture part of the class.
2. Encourage the development of scientific literacy, i.e., the ability to find, read, comprehend, and discuss original research articles from the physiology literature.
3. Deepen your appreciation of the scientific method by requiring you to design, execute, and analyze your own experiments.
4. Develop writing skills in the format of scientific research papers and a lab manual exercise.

## Laboratory Sections (all in ZHS 372)

Tue am	11:00-1:50	13284R	Thu am1	8:00-10:50	13282R
Tue pm	3:00-5:50	13288R	Thu am2	11:00-1:50	13285R
Wed am	8:00-10:50	13281R	Thu pm	3:00-5:50	13289R
Wed pm	2:00-4:50	13286R	Fri pm	2:00-4:50	13287R

## Lab Manual

- A laboratory manual will not be required for this class. Handouts describing the lab exercises will be distributed as PDF files via Blackboard.

## Lab Grading

- Performance in the lab will account for one third of each student's grade. The lab grade will be based on a group presentation, participation in others' presentations, lab reports, development of a teaching lab exercise, and general participation. Descriptions of these items follow. See the Grading Table (page 5, above) for point values.
- To encourage improved writing, lab reports will be graded strictly, according to a published rubric which was adapted by Dr. Herrera for this course. Grading criteria for lab reports will be published on Blackboard. See below for details.
- We do not anticipate significant differences in grading practices between Laboratory Instructors. If significant differences occur, lab grades will be normalized at the end of the course before final grades are assigned.

## Lab Performance Guidelines

- You must attend all lab sessions on time and to remain for the entire period or until excused by your Lab Instructor. Unexcused absences will affect your general participation scores.
- For some lab exercises, it will be necessary for you to place your backpacks, purses, and other materials under the tables. Please follow your Lab Instructor's instructions. At the end of the lab session, please clean your work area. Return supplies to their proper place. Dispose of chemicals, animal tissues, sharp objects, and contaminated material appropriately. Close all open applications on your computer workstations.

## Group Presentations

- In groups of two, students will present classic papers from the primary research literature in physiology. The purpose of this exercise is to enhance scientific literacy, as well as improve your skills in communication and collaborative problem solving. We also hope you will gain a deeper understanding of the origin of physiological knowledge and the links between early discoveries

and current research. For a complete description of group presentation requirements, see the document “Guidelines for Group Presentations of Classic Papers” posted in Blackboard. Here is a brief summary:

1. During the lab meeting in the first week of the semester, groups consisting of 2 students each will be formed.
2. Each group will select one classic physiology paper from a list that will be provided in Blackboard. Copies of the papers in PDF format will also be available in Blackboard. Other papers can be used, but these must be approved in advance.
3. During the 4th week of the semester, each group will give a 20 minute PowerPoint presentation to their lab section, and then conduct a 5-10 minute session for questions, answers, and discussion.
4. Grading will be based on each student’s participation in her/his group’s presentation, as well as participation in the presentations of other groups.

### Lab Reports

- Developing the ability to write a high-quality lab report is one of the primary learning objectives of the laboratory portion of this class. Because they integrate so many other laboratory skills, almost half of the lab points will be based on these lab reports – about the same as a lecture exam! The requirements and grading policies for lab reports is given in the document “Guidelines 307-17 Lab Reports” posted in Blackboard. *Please read this document.*
- Lab reports will be written in the standard format of a scientific research paper, with 5 sections: Introduction, Methods, Results, Discussion, and References. To help you master writing in this format, you will be asked to write 3 Short Lab Reports based on the exercises you perform during weeks 5, 6, and 12 of the semester. Please refer to the Lab Schedule on p. 9 to see the topics of these exercises. Although Short Lab Reports 1, 2, and 3 must contain all 5 sections listed above, grading will emphasize the acquisition and analysis of data. Short Lab Reports 1 and 2 must be submitted within one week, i.e., by the start of the next lab period. Two weeks will be allotted Short Lab Report 3, to avoid conflict with Lecture Exam 3. Each of these short lab reports will be worth 15 points, for a total of 45 points.
- At the end of the semester (Apr 29), a Full Lab Report must be submitted. This Full Lab Report will be worth 50 points. All 5 sections will be carefully examined and graded. The subject of the Full Lab Report will be original experiments that your lab group conducted during the 11<sup>th</sup>, 12<sup>th</sup>, and 15<sup>th</sup> weeks of the semester. The lab meeting in the 13<sup>th</sup> week is reserved for planning and discussing your experiments with your Lab Instructor and other students in your lab section. You may also begin your experiments on that day. Within 48 h of the 13<sup>th</sup> week lab session, you and your lab partner(s) must send your Lab Instructor a 1-page proposal describing the experiments you intend to do. Instructions for the 1-page proposal will be published on Blackboard. The experiments you design should use the equipment and approaches employed in one or more of the following lab exercises: Cardiovascular Physiology (week 5), Skeletal Muscle Contraction (week 6), Lung Function – Spirometry\* (week 7), or Kidney Function – Urinalysis (week 8).
  - \*In addition to the equipment used in the Lung Function – Spirometry lab, a limited number of devices for real-time measurement of O<sub>2</sub> and CO<sub>2</sub> in human subjects will be available.
- Please note that we have high expectations for the quality of both the partial and full lab reports. They will be graded stringently, according to the criteria described in the “Guidelines 307-19 Lab Reports” document.

- Submission of Lab Reports: All lab reports must be submitted electronically via Turnitin, using the link provided on the Blackboard site for your lab section. Once you submit your lab report, Turnitin will perform an originality review, searching for similarities between your text and other internet content or previously submitted student work. Each student will retain the copyright of her/his own original work. Turnitin is not permitted to use student-submitted work for any purpose other than a) performing an originality review of your work, and b) including your work in the database against which it checks other student-submitted work. Please see the section on Academic Integrity above for an explanation of why we are using Turnitin.
- It is your responsibility to confirm that your lab reports were successfully uploaded.
- Late Lab Reports: If you miss a lab report deadline, your report will lose 20% of its point value during every 24-hour period after the deadline. For example, let's say a student writes a report that would earn 40 of the 50 points available if it were submitted on time. If the same report were submitted late, after the deadline but before 24 hours after the deadline, the report would earn only 32 points. Point deductions would increase by an additional 20% for each subsequent 24 hour period of lateness.
- Excessive Quotation in Lab Reports: Please read p. 5 of the Guidelines document for advice on how to avoid this common pitfall, and for penalties that will be imposed should it occur.

### **Frog Lab Exercise**

- Experimenting with living tissue from freshly euthanized animals is a privilege and a learning opportunity that can be tremendously valuable. Rather than asking you to perform typical lab exercises, we want to engage your creativity to plan and execute novel experiments, and then prepare a written report in the format of a Frog Lab Exercise. The document, which will be worth 50 points, should include sections that give the necessary background, methods, and procedure. Specific experiments should be described, sample results illustrated, and thought-provoking questions should be posed. Detailed instructions on the written format of the Frog Lab Exercise will be published on Blackboard.
- Experiments for the Frog Lab Exercise will use the sciatic nerve, skeletal muscle, or heart of the northern leopard frog *Rana (Lithobates) pipiens*. During the lab meeting in the 13<sup>th</sup> week you will familiarize yourself with dissecting and handling these preparations and with the equipment available to make measurements. The lab meeting in the 14<sup>th</sup> week is intended for planning and discussing your project with your Lab Instructor and other students in your lab section. Within 48 h of the 14<sup>th</sup> week lab session, you and your lab partner(s) must send your TA a 1-page proposal describing the specifics of your Frog Lab Exercise project. Instructions for the 1-page proposal will be published on Blackboard.

### **Final Thoughts**

- Please forgive the length of this syllabus. We feel it is important for everyone to know exactly what to expect. We hope you will enjoy our mutual exploration of physiology. The mechanisms we will study are fundamentally important in all animals, and highly relevant to the understanding of human health. We promise to apply all of our experience in teaching and research, as well as some of the latest pedagogical techniques, to present an interesting and informative course and to assign grades fairly. Good luck!

Albert Herrera, Dec 26 2018