

## BISC 307 (General Physiology), Spring 2018

### Lecture Schedule

Date	Day	Topic	Silverthorn – 7 <sup>th</sup> Ed.	Quizzes*
Jan 8	M	01 Introduction	Ch 1, Ch 6 (182-191)	
Jan 10	W	02 Evolutionary Perspectives 1	See Blackboard for resources	
Jan 12	F	03 Evolutionary Perspectives 2	See Blackboard for resources	Quiz 1
Jan 15	M	<i>Holiday (MLK Day)</i>	-----	
Jan 17	W	04 Membrane Dynamics	Ch 5	
Jan 19	F	05 Cellular Communication	Ch 6 (165-182)	Quiz 2
Jan 22	M	06 Electrical Signals 1	Ch 8 (226-253)	
Jan 24	W	07 Electrical Signals 2	Ch 8 (226-253)	
Jan 26	F	08 Action Potentials 1	Ch 8 (226-253)	Quiz 3
Jan 29	M	09 Action Potentials 2**	Ch 8 (226-253)	
Jan 31	W	10 Synaptic Transmission 1	Ch 8 (253-271)	
Feb 2	F	11 Synaptic Transmission 2	Ch 8 (253-271), Ch 11 (358-371)	Quiz 4
Feb 5	M	<b>EXAM 1</b>	Jan 8 through Jan 31 (10 lects)	
Feb 7	W	12 Skeletal Muscle 1	Ch 11 (371-375), Ch 12 (377-393)	
Feb 9	F	13 Skeletal Muscle 2	Ch 12 (393-403)	Quiz 5
Feb 12	M	14 Skeletal Muscle 3	Ch 12 (393-403)	
Feb 14	W	15 Smooth Muscle	Ch 12 (403-411)	
Feb 16	F	16 Regulation of Metabolic Fuel 1	Ch 22 (693-719)	Quiz 6
Feb 19	M	<i>Holiday (President's Day)</i>	-----	
Feb 21	W	17 Regulation of Metabolic Fuel 2	Ch 22 (693-719)	
Feb 23	F	18 Adrenal Glucocorticoids 1	Ch 7, Ch 23 (729-736)	Quiz 7
Feb 26	M	19 Adrenal Glucocorticoids 2	Ch 7, Ch 23 (729-736)	
Feb 28	W	20 Thyroid, Growth Hormone	Ch 23 (736-743)	
Mar 2	F	21 Calcium Balance***	Ch 23 (743-751)	Quiz 8
Mar 5	M	<b>EXAM 2</b>	Feb 2 through Feb 28 (10 lects)	
Mar 7	W	22 Reproduction 1	Ch 26 (800-823)	
Mar 9	F	23 Reproduction 2	Ch 26 (824-837)	Quiz 9
Mar 12	M	<i>Spring Break</i>	-----	
Mar 14	W	<i>Spring Break</i>	-----	
Mar 16	F	<i>Spring Break</i>	-----	-----
Mar 19	M	24 Cardiovascular System 1	Ch 14 (435-454)	
Mar 21	W	25 Cardiovascular System 2	Ch 14 (435-454)	
Mar 23	F	26 Heart as a Pump 1	Ch 14 (454-475)	Quiz 10
Mar 26	M	27 Heart as a Pump 2	Ch 14 (454-475)	
Mar 28	W	28 Heart as a Pump 3	Ch 14 (454-475)	
Mar 30	F	29 Blood Vessels & Pressure	Ch 15 (477-491)	Quiz 11
Apr 2	M	30 Distribution of Blood	Ch 15 (492-507)	
Apr 4	W	31 Blood	Ch 16	
Apr 6	F	<b>EXAM 3****</b>	Mar 2 through Apr 2 (10 lects)	Quiz 12
Apr 9	M	32 Respiratory System 1	Ch 17	
Apr 11	W	33 Respiratory System 2	Ch 18	
Apr 13	F	34 Respiratory System 3	Ch 18	Quiz 13
Apr 16	M	35 Kidney Function & Filtration 1	Ch 19 (589-602)	
Apr 18	W	36 Kidney Function & Filtration 2	Ch 19 (589-602)	
Apr 20	F	37 Tubular Reabsorption & Secretion	Ch 19 (602-615)	Quiz 14
Apr 23	M	38 Water & Salt Balance 1	Ch 20 (618-636)	
Apr 25	W	39 Water & Salt Balance 2	Ch 20 (618-636)	
Apr 27	F	40 Volume, Osmolarity, Acid-Base Balance	Ch 20 (636-652)	-----

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

\*\* Friday, January 26 is the last day to drop without a mark of "W" and with tuition refund.

\*\*\* Friday, February 23 is the last day to drop without a mark of "W" and without tuition refund.

\*\*\*\* Friday, April 6 is the last day to drop with a mark of "W".

May 2	W	<b>EXAM 4, 2:00 – 4:00 pm</b>	Apr 4 through Apr 27 (10 lects)
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## A. General Course Description and Policies

### 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 animal cells, tissues, organs, and organ systems, with emphasis on mechanisms by which homeostasis is maintained, and on the integration of each system with others in the living animal. Human systems are emphasized.

### 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 Instructor

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### Textbooks

- *Human Physiology: An Integrated Approach*, by Dee Unglaub Silverthorn, 7th edition.  
*Note:* The 7<sup>th</sup> edition is not substantially different from the 6<sup>th</sup> edition. Students interested in saving money may opt for the older version. The corresponding reading assignments for the 6<sup>th</sup> and 5<sup>th</sup> editions will be posted on Blackboard (see Course Documents). Users of the 6<sup>th</sup> and 5<sup>th</sup> editions should consult the 7<sup>th</sup> edition to check for differences. Copies of the 6<sup>th</sup> and 7<sup>th</sup> edition 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, pp. 6-7).

### Lecture

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

- Lecture section meetings will be recorded and made available as streaming video and downloadable audio files. Files and links to download sites will be posted in Blackboard. Although recordings will focus on the PowerPoint slides and lecturer, students 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 should 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 review difficult material. In this way, you will keep up with the lecture schedule and reserve the time just before exams to review material and, importantly, 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 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 5, 1:00-1:55 pm  
Exam 2: Monday, Mar 5, 1:00-1:55 pm  
Exam 3: Friday, Apr 6, 1:00-1:55 pm  
Exam 4: Wednesday, May 2, 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. 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 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 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 a few 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 results and correct answers will be discussed at the start of the Thursday morning Q&A session (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 will deprive that 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 11 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 12	Jan 16	1, 2
2	Jan 19	Jan 23	3, 4
3	Jan 26	Jan 30	5, 6, 7
4	Feb 2	Feb 6	8, 9, 10
5	Feb 9	Feb 13	11, 12
6	Feb 16	Feb 20	13, 14
7	Feb 23	Feb 27	15, 16, 17
8	Mar 2	Mar 6	18, 19, 20
9	Mar 9	Mar 20	21, 22
10	Mar 23	Mar 27	23, 24, 25
11	Mar 30	Apr 3	26, 27, 28
12	Apr 6	Apr 10	29, 30, 31
13	Apr 13	Apr 17	32, 33
14	Apr 20	Apr 24	34, 35, 36

### Twice Weekly Question & Answer Sessions

- Dr. Herrera will hold Q&A sessions at the following times and places.  
Wednesdays, 4:00-4:50 pm, HNB 100 (results and answers of online quizzes discussed)  
Fridays, 2:00-2:50 pm, HNB 100 (no Friday Q&A session on Apr 6)
- Q&A sessions will be recorded and made available as streaming video and downloadable audio podcasts. For those unable to attend in person, Q&A sessions will also be webcast live with text-

based chat so that questions can be submitted remotely. Instructions for accessing live and recorded Q&A sessions will be posted in Blackboard and announced in class.

- Although no deliberate attempt will be made to record or identify students who are present at Q&A sessions, and students will not be on-camera, please be aware that in the confines of the room, students' voices may be audible and recognizable.

### 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/>

### **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, translator, 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 assignments or exams. When a class will be missed for a sanctioned competition, it is the student-athlete's responsibility to approach the instructor in advance and to provide a letter from Magdi El Shahawy, Director of Student-Athlete Academic Services. The letter must certify that the competition is a University-sponsored event that deserves accommodation. Accommodations will not be made for other types of conflicting events. Details on the University's policy can be found at [https://www.provost.usc.edu/oaaaa\\_guidelines/](https://www.provost.usc.edu/oaaaa_guidelines/).

Final 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 an exam is 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 the average of the scores of the other exams.

### **Email Communication**

Only students' USC computer accounts (*usc.edu* domain name) can be used for email communications regarding confidential matters. Other email accounts (gmail, *etc.*) cannot be used. Students are responsible for understanding the content of official messages that instructors send to their USC email accounts. Therefore, each student must check their USC email regularly to make sure their account is not over-quota, so new messages can be received.

## B. Laboratory

### Lab Schedule

Wk	Dates	Day	Exercises	Comments
1	Jan 9 ↓ Jan 12	Tu ↓ Fri	NO LAB MEETING THIS WEEK	
2	Jan 16 ↓ Jan 19	Tu ↓ Fri	Introduction to Lab	Safety issues; Discussion of Group Presentations; Discussion of Lab Reports & Teaching Exercise
3	Jan 23 ↓ Jan 26	Tu ↓ Fri	<i>No lab this week</i>	
4	Jan 30 ↓ Feb 2	Tu ↓ Fri	Group Presentations	PowerPoint presentations & discussion of classic scientific papers
5	Feb 6 ↓ Feb 9	Tu ↓ Fri	Cardiovascular Physiology (Human)	
6	Feb 13 ↓ Feb 16	Tu ↓ Fri	Skeletal Muscle Contraction (Human)	Subject of Short Lab Report 1 (due week of Feb 20-23)
7	Feb 20 ↓ Feb 23	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 27 ↓ Mar 2	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 6 ↓ Mar 9	Tu ↓ Fri	Plan, discuss, and submit proposal (within 48 h) for human experiments for Full Lab Report; Submit Short Lab Report 3	
10	Mar 13 ↓ Mar 16	Tu ↓ Fri	<i>Spring Break Week</i>	
11	Mar 20 ↓ Mar 23	Tu ↓ Fri	Experiments for Full Lab Report	Each group performs its own experiments
12	Mar 27 ↓ Mar 30	Tu ↓ Fri	Experiments for Full Lab Report	Each group performs its own experiments
13	Apr 3 ↓ Apr 6	Tu ↓ Fri	Nerve Conduction, Skeletal Muscle Contraction, Heart Function (Frog)	
14	Apr 10 ↓ Apr 13	Tu ↓ Fri	Plan, discuss, and submit proposal (within 48 h) for Frog Exercise Submit Full Lab Report	Full Lab Report Due
15	Apr 17 ↓ Apr 20	Tu ↓ Fri	Experiments for Frog Exercise	Each group performs its own experiments
16	Apr 24 ↓ Apr 27	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 30	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

### In ZHS 372:

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

### In ZHS 258:

Wed pm	2:00-4:50	13296R
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## Lab Manual

- A laboratory manual will not be required for this class. Handouts (PDFs) describing the lab exercises will be distributed 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 pp. 11-12 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 3rd or 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 30), 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 13<sup>th</sup>, 14<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 11), or Kidney Function – Urinalysis (week 12).

\*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 307-17 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 reserved for planning and discussing your project with your Lab Instructor and other students in your lab section. Within 48 h of the 8<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, Nov 9 2017