

## **A. Logistics**

Mode	Section	Day	Time	Room
Lecture	All	Tuesday, Thursday	8:00-9:15 am	131 Lamar Hall
Laboratory	1	Wednesday	12:00-2:50	429 Shoemaker
Laboratory	2	Wednesday	3:00-5:50	429 Shoemaker
Laboratory	3	Tuesday	12:30-3:20	429 Shoemaker
Laboratory	4	Tuesday	3:30-6:20	429 Shoemaker
Laboratory	5	Thursday	12:30-3:20	429 Shoemaker

## **B. Course Instructors**

### 1. Faculty

Mika Jekabsons, Ph.D.

Office: 110 Shoemaker

Email: [jekabson@olemiss.edu](mailto:jekabson@olemiss.edu)

Phone: 915 3998

Office hours (open learning sessions): Monday 4:15-5:30pm, Friday 4:15-5:30pm, or by appointment

### 2. Teaching Assistants

A. Chyna-Rae Dearman (Sections 1 and 2; Labs 6-10 for Section 5); Office: 229 Shoemaker.

B. Sarah Amonett (Sections 3 and 4; Labs 1-5 for Section 5); Office: 526 Shoemaker; office hours Friday 10am-12pm.

## **C. Course Texts**

### 1. Required Lecture textbook

Sherwood, L. Human Physiology, From Cells to Systems, 9<sup>th</sup> Edition, Brooks/Cole Publishing

2. There is no required lab manual. All lab procedures are available online on Blackboard.

## **D. Course Description**

This is a one semester course in systemic physiology, with an emphasis on human physiology. The lecture is designed as a first course in physiology for Biology majors, assuming a fundamental understanding of cellular processes. It will explore some of the mechanisms important for cell, organ, and organ system function. Concepts from chemistry and cell biology will be integrated with those from organs and organ systems to establish the fundamental principles underlying organismal function. Information relevant to the function of most major organ systems will be covered in the lecture, and examples of physiological principles will be conducted in the laboratory.

## **E. Learning Objectives**

Upon completing this course, students should understand the principles governing (a) homeostasis, (b) electrical properties of excitable cells, (c) cell-cell communication by neurotransmitters and hormones, (d) nervous system organization and function, (e) skeletal muscle organization and function, (f) cardiac muscle/heart organization and function, (g) cardiovascular organization and function, (h) respiratory organization and function. If time permits, renal function may also be covered. Students should understand how the interaction of specific molecules contributes to cell function, how collective cell function contributes to tissue and organ function, and how organs contribute to homeostasis. Graduate students are exempt from taking the lab but must write a paper either exploring recent advances within an area of physiology that is of interest to the student, or on novel or interdisciplinary approaches to investigating physiological function. The paper should have a minimum length of 6 pages with a reference section that includes at least 10 original research articles.

## **F. Grading**

1. Midterm 1	100
2. Midterm 2	100
3. Comprehensive Final Exam	200
4. Paper	100

Midterms will generally be multiple choice, but short answer and/or essay questions are possible. You must bring the Scantron form 882-E for each midterm exam. The forms are available in the bookstore. Quizzes will be given during the first 15min of the laboratory period and will mainly be short answer and essay based on lecture material. Be punctual, as extra time will not be given if you are late.

Letter grades will be assigned as follows: **A:** 90-100%; **B:** 80-89.9%; **C:** 70-79.9%; **D:** 60-69.9%; **F:** <60%. These are percentages of total possible points accumulated from both the in-class exams and the laboratory abstracts and quizzes. In the event that 10% of the class does not score 90% or higher, the A cutoff will be lowered until a minimum of 10% of the class receives an A. However this does come with restrictions, as the A cutoff will not be lowered below 85% of total possible points even if less than 10% of the class score greater than or equal to 85%. Therefore, you should expect that the minimum A will fall somewhere between 85-90%. In the event that the A cutoff is lowered below 90%, the range of all other letter grades will be increased from 9.9 to 10.9%. As an example, if the A's are greater than or equal to 87%, then the B range will be 76-86.9%, the C range 65-75.9%, the D range will be 54-64.9%, and scores less than 54% will receive an F. The greatest possible 'curve' applied to the class would be: A: greater than or equal to 85%, B: 74-84.9%, C: 63-73.9%, D: 52-62.9%, F: less than 52%. There is no extra credit option for this course.

Note that I will use the +/- grading system for this course. The additional grades possible are: A-, B+, B-, C+, and C- (no D+, D-). It is important to know that a C- is not a passing grade for Biology majors, and is not an adequate grade for acceptance into other courses having Physiology as a prerequisite. The +/- grading will be applied to students within two percentage points below a letter grade cutoff. Students falling short of a higher letter grade by 0.1-0.9% will receive the higher letter grade, designated with a minus. Students falling short of a higher letter grade by 1.0-1.9% will receive the lower letter grade designated with a plus. For example, if the A cutoff is 87%, then an A- would be 86.0-86.9%, and a B+ would be 85.0-85.9%. The B range is then 76.0-84.9%.

## **G. Attendance and Policies**

1. To comply with the requirements set forth by the US Department of Education, attendance will be taken for the first two classes to verify that those enrolled attend the course. Attendance will be documented by use of the attendance scanners. It is university policy that students must attend the first meeting of the course, and if a student's attendance has not been verified by the end of the third week of class, the student will be administratively dropped from the class. After the verification period, for the remaining lectures, attendance to the lecture is voluntary. Laboratory attendance is mandatory, and is restricted to the lab section in which you enrolled. Excused absences are limited to illnesses (with official documentation from a Health Care Professional) and University-sponsored trips (with documentation).

2. Laboratory attendance is mandatory. Each unexcused lab absence will result in a 25 pt deduction from your final point total (this is in addition to scoring a zero on your lab abstract and quiz for that week).

3. The laboratory sections do not meet during the first week of classes. Come to the laboratory prepared by reading all relevant material that covers the laboratory procedures.

4. Make-up exams will be given at a mutually agreed upon time at the discretion of the instructor under the following circumstances: illness (with documentation), family emergency (with documentation and contact information), University-sponsored event (with documentation and contact information), religious holiday, or civic responsibilities. Make-up exams may differ by being predominantly essay.

5. Academic dishonesty, plagiarism, or other conduct of this nature will not be tolerated.

6. All cell phones, pagers, etc. must be turned off during Lecture and Laboratory periods. This means that no text messaging, web surfing, or conversing via an electronic device is allowed at any time (including during exams and quizzes).

7. No eating, drinking, or using tobacco-related products in the Laboratory.

8. Quizzes will be administered during the first 15min of lab. Don't be late, as you will not be given extra time to take the quiz. Make-up quizzes will not be given, even with an excused absence; final grading will be adjusted for lost points.

9. The instructor reserves the right to adjust laboratory grades in the event of grading disparities between lab sections.

## **H. Disability Access and Inclusion**

The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation, or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content, and the use of non-captioned or non-transcribed video and audio files. If you are approved through SDS, you must log in to your Rebel Access portal at <https://sds.olemiss.edu> to request approved accommodations. If you are NOT approved through SDS, you must contact Student Disability Services at [662-915-7128](tel:662-915-7128) so the office can: 1. determine your eligibility for accommodations, 2. disseminate to your instructors a Faculty Notification Letter, 3. facilitate the removal of barriers, and 4. ensure you have equal access to the same opportunities for success that are available to all students.

### **I. Lecture schedule of topics to be covered**

Week #	Dates	Lecture #	topics
1	1/21/20, 1/23/20	1, 2	Introduction: Levels of organization, Control systems and homeostasis Ch. 1
2	1/28/20, 1/30/20	3, 4	Membrane transport, diffusion, and properties of transporters and channels; Nernst and GHK equations; How cells generate resting membrane potentials- Ch. 3
3	2/4/20, 2/6/20	5, 6	Properties of graded potentials and action potentials; Action potentials and neuronal function; Neuron-neuron communication - Ch. 4
4	2/11/20, 2/13/20	7, 8	Mechanisms of intercellular communication: neurotransmitter and endocrine- Ch. 4; Properties of afferents- Ch. 6; Interneurons and organization of brain and spinal cord- Ch. 5;
5	2/18/20	9	Functional properties of a somatic reflex- Ch. 5;
5	2/20/20	-	Midterm 1
6	2/25/20, 2/27/20	10, 11	Properties of autonomic efferents; Organization and neurotransmitters of autonomic nervous system- Ch. 7; Motor neurons and the neuromuscular junction- Ch. 7;
7	3/3/20, 3/5/20	12, 13	Skeletal muscle: organization and sarcomere structure; Excitation-contraction coupling- Ch. 8;
8	3/10/20, 3/12/20	-	Spring Break
9	3/17/20, 3/19/20	14, 15	Skeletal muscle: control of force- Ch. 8; Cardiac muscle compared to skeletal- Ch 8/Ch. 9; Organization of the heart- Ch. 9
10	3/24/20, 3/26/20	16, 17	Initiation and spread of electrical activity in the heart; Mechanical events of cardiac cycle- Ch. 9
11	3/31/20	18	Cardiac output and its control- Ch. 9
11	4/2/20	-	Midterm 2
12	4/7/20, 4/9/20	19, 20	Properties of blood vessels and their organization; determinants of pressure, flow, and resistance; Oscillations in arterial pressure over a cardiac cycle- Ch. 10
13	4/14/20, 4/16/20	21, 22	Arterioles and control of tissue blood flow; Regulation of mean arterial pressure- Ch. 10
14	4/21/20, 4/23/20	23, 24	Respiratory system: overview, components; Transmural and recoil forces; Process of ventilation- Ch. 13;
15	4/28/20, 4/30/20	25, 26	Pulmonary and alveolar ventilation rates; Partial pressures and gas exchange, Blood gas transport; Control of ventilation- Ch. 13
16	5/5/20	Final exam	Comprehensive final exam, 8am

This is a tentative schedule, and is subject to change. Lectures are in 130 Lamar Hall.

### **J. Lab schedule of topics to be covered**

Week #	Date	Lab #	topics
1	1/21-23/20	no labs	no labs
2	1/28-30/20	1	Introduction; Lab 1: Instrumentation (Blackboard protocol)
3	2/4-6/20	2	Lab 2 Simple somatic reflexes (Blackboard protocol)
4	2/11-13/20	3	Lab 3 Autonomic Dive reflex (Blackboard protocol)
5	2/18-20/20	-	no labs, exam week
6	2/25-27/20	4	Lab 4 Sensory physiology (Blackboard protocol)
7	3/3-5/20	5	Lab 5 Muscle (Blackboard protocol)
8	3/10-12/20	-	Spring Break
9	3/17-19/20	6	Lab 6 Blood (Blackboard protocol)
10	3/24-26/20	7	Lab 7 Blood pressure (Blackboard protocol)
11	3/31-4/2/20	-	no labs, exam week
12	4/7-9/20	8	Lab 8 ECG and Exercise (Blackboard protocol)
13	4/14-16/20	9	Lab 9 Bicarbonate as buffer (Blackboard protocol)
14	4/21-23/20	10	Lab 10 Respiration (Blackboard protocol)
15	4/28-30/20	no labs	Turn in Respiration abstract
16	5/5-7/20	no labs	finals week

Most laboratory exercises illustrate selected physiological principles using human volunteers. Therefore, come prepared to have your bodily functions recorded. Other exercises cover laboratory techniques commonly used throughout physiology, cell biology, and biochemistry. All lab procedures are available on Blackboard and should be printed prior to coming to the laboratory. Be sure to read all procedures and background material before coming to the lab. You will turn in a one page written abstract for each laboratory. Each abstract is due the following week at the beginning of lab; late abstracts will not be accepted. Each abstract is worth 15 points.