

## BSC 283 Animal Physiology, Spring 2019

### Instructor:

Dr. Andrés Vidal-Gadea

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Office Hours: MWF 4:00 – 5:00 PM

***All emails to us must have **BSC 283** in the subject line!***

### Lab TAs:

Josselyn Gonzales (Head TA): [jgonz16@ilstu.edu](mailto:jgonz16@ilstu.edu)

Casey Gahrs: [cjgahrs@ilstu.edu](mailto:cjgahrs@ilstu.edu)

### Lecture Location, Dates, Times:

Lectures: 3:00 - 3:50 PM, MWF, Julian Hall 226

### Prerequisites:

BSC 196 and 197; CHE 110 and 112, or CHE 141; majors only; junior or senior standing, or consent of instructor.

### Course Description:

Organisms must coordinate their activities to successfully meet the challenges of life. In animals and humans, such coordination usually involves maintaining homeostasis and interaction between the body and the environment. This course provides students with an understanding of how animals and humans adapt physiologically to environmental challenges and addresses the basic physical and chemical principles that underlie physiological processes. Several biological systems are considered, including respiratory, circulatory, digestive and metabolic, osmoregulatory, renal, musculoskeletal, neural, and sensory. The laboratory sessions will complement the lecture, mainly by providing hands-on experience in observation, data collection, measurement, and problem-solving skills. Thus, students will gain an understanding of how physiological mechanisms are used to regulate complex biological systems and to integrate their various functions.

**Objectives:** The overall objective of this course is to provide undergraduate students a comprehensive understanding of animal physiology through the media of lectures and laboratories.

### Lectures will be posted on Reggienet.

Following class, Lecture slides will be deposited on Reggienet. Most figures mentioned during lecture are located in your textbook, and they will be in the uploaded slides.

**Laboratory (SLB 431):**

Section 1: T 09:00-11:50 AM

Section 2: T 01:00-03:50 PM

There will be 10 laboratory exercises as described in the laboratory syllabus. After completion of each exercise, students will write a short (max. 3 pages) laboratory report that will be due at the beginning of the next laboratory meeting. Late assignments will not be accepted and will be given a zero. The laboratory report must contain a short summary of the objectives (in narrative writing, using your own words) of the exercise, a concise summary of the experimental design and of the results obtained. A separate handout will be provided with additional information about the format of the report.

Because of the size of this class, there are no make-ups for missed labs. Instead of make-up exams, each student will have their lowest scoring lab report dropped from their grade calculation automatically. There will therefore be no additional make-up credit for absences, sick days, etc. The Teaching Assistants are the first persons to be contacted about lab. A handout for each laboratory exercise will be posted the week before the lab.

**Grading:**

There are **three in-class exams** during the semester and a **final exam** (non-cumulative). Exams will consist of multiple choice, matching, short answer and essay questions. Each exam is worth 162.5 points (650 points for the 4 exams). Each laboratory exercise is worth 35 points (350 points for 10 quizzes and exercises). To receive full points for laboratory exercises it is expected that you will contribute to the exercise in a meaningful way, that you complete the laboratory report, and that you will be respectful of others.

Four Lecture Exams (@ 162.5 points, 16.25% each):	650 points	65%
<u>Ten Lab grades (@ 35 points, 3.5% each):</u>	<u>350 points</u>	<u>35%</u>
Total	1000 points	100%

Final grades will be determined based upon the following scale: A = 100 - 90, B = 89 - 80, C = 79 - 70, D = 69 - 60, F = below 60

A **quiz** will typically be given before the beginning of each lecture. The percentage grade on these short quizzes will be added to the subsequent exam as **extra credit** for up to 25 points. However, the score on any exam will not exceed 162.5 points.

Attendance at exams is mandatory. If an absence is unavoidable, you must notify the instructor in advance for sponsored school events or within 24 hours for illness/personal reasons. Documentation for your absence may be requested prior to scheduling an alternate exam. It is your responsibility to notify me if you cannot attend an exam. If you miss an exam without the proper notification, that exam will count as a zero. In case of a death in the family, you must provide a letter from the clergy or funeral directors for you to take a makeup exam.

### **Expectations and Student Responsibilities:**

Students are expected to read the instructed selections in the text and handouts, and attend lectures and laboratory sessions prepared. NOTE: If you rely solely on the *Outlines* for studying, you'll most likely perform very poorly on the exams. If you miss a class, **it is your responsibility** to obtain the class lecture notes.

#### Andrés' recipe to do well in BSC283:

- 1) Read the chapter ahead of class. Not in depth, just like you would read the paper, or a blog. Don't worry or stop for challenging concepts, etc.
- 2) Come to lecture and actively listen. If you read the chapter, the material will be familiar. Let me explain to you the challenging bits, and highlight the important things. Do not take notes mindlessly, the lectures will be available. If you never read the chapter before class, lecture will feel like is going very fast.
- 3) Go back to lectures and review material after class. Use my office hours; they have a tendency to help people increase their grade.
- 4) When you prepare for an exam, try the white page test. Take breaks from reading, and use a paper to jolt down what you just learned (without looking at the material). When you are done, look again at the course material and compare how much of it you were able to write about. Focus your effort on what you missed. Students (humans) tend to stick with what they know, this should help you with that.

If you have to miss class due to an extended illness (3 or more consecutive class days) or a bereavement, please notify me by email/phone *AND* contact the Dean of Students Office. It's located in Room 387, Student Services Building.

Any student needing to arrange a reasonable accommodation for a documented disability and/or medical/mental health condition should contact Student Access and Accommodation Services at 350 Fell Hall, (309) 438-5853, or visit the [StudentAccess.IllinoisState.edu](http://StudentAccess.IllinoisState.edu).

### **Laboratory:**

The Laboratory material covered is an essential part of this course. Attendance is mandatory. Read the appropriate laboratory handouts before attending the laboratory.

### **Textbooks for the Course and Laboratory:**

Silverthorn, DU. 2019. Human Physiology: An Integrated Approach, 8<sup>th</sup> Edition, Pearson/Prentice Hall, NJ. Older versions should be fine as well, but might not contain the same diagrams and figures. **Chapters in the schedule are given for the 8<sup>th</sup> edition.**

### **Alternative Textbooks and Readings:**

- Randall, D. Eckert Animal Physiology. W.H. Freeman and Co. 5th edition.
- Berne, Levy, Koepfen, and Stanton. 2004. Physiology. 5<sup>th</sup> Edition. Mosby. St. Louis.
- Fox SI. 2009. Fundamentals of Physiology. McGraw-Hill.
- Guyton and Hall. 1997. Human Physiology and Mechanisms of Disease. 6<sup>th</sup> Edition. W.B. Saunders Company, Philadelphia.
- Stabler T et al. 2009. PhysioEx 8.0 for Human Physiology: Laboratory Simulations in Physiology. Benjamin Cummings, San Francisco, CA.
- Widmaier EP, Raff H and Strang KT. 2006. Vander's Human Physiology. The Mechanisms of Body Function. 10<sup>th</sup> Edition. McGraw-Hill, NY.

**Lecture Schedule**

<b>Week</b>	<b>Topic</b>	<b>Text Chapter Readings</b>
<b>Jan 14</b>	Introduction to Physiology	1
	Physiological Compartments	3
	Membrane Dynamics I	5
<b>Jan 21</b>	<b><i><u>Martin Luther King Jr. Day. no class</u></i></b>	
	Membrane Dynamics II	5
	Cell Signaling	6
<b>Jan 28</b>	<b>Neuron Function I</b> (last day to drop)	8
	Neuron Function II	8
	Neural Organization I	9
<b>Feb 4</b>	Neural Organization II	9
	Sensory Physiology I	10
	Sensory Physiology II	10
<b>Feb 11</b>	<b><i><u>Exam #1, Monday, Feb 11</u></i></b>	
	Motor Control I	11
	Motor Control II	11
<b>Feb 18</b>	Muscle Physiology I	12
	Muscle Physiology II	12
	Control of Movement I	13
<b>Feb 25</b>	Control of Movement II	13
	Cardiovascular Physiology I	14
	Cardiovascular Physiology II	14
<b>Mar 4</b>	Blood Flow & Pressure I	15
	Blood Flow & Pressure II	15
	Blood	16
<b>Mar 11</b>	<b><i>Spring Break – no classes</i></b>	
	<b><i>Spring Break – no classes</i></b>	
	<b><i>Spring Break – no classes</i></b>	
<b>Mar 18</b>	<b><i><u>Exam #2, Monday, Mar 13</u></i></b>	
	Mechanics of Breathing	17
	Gas Exchange & Transport I	18
<b>Mar 25</b>	Exchange & Transport II	18
	Exercise	25
	Kidneys I	19
<b>Apr 1</b>	Kidneys II	19
	Fluid and Electrolyte Balance	20
	Digestive Physiology I	21
<b>Apr 8</b>	Digestive Physiology II	21
	<b><i><u>Exam #3, Wednesday, Apr 10<sup>th</sup></u></i></b>	
	Metabolism and Energy Balance	22

*Continued on next page*

<b>Week</b>	<b>Topic</b>	<b>Text Chapter Readings</b>
<b>Apr 15</b>	Introduction to the Endocrine System	7
	Endocrine Control of Growth & Metabolism I	23
	Endocrine Control of Growth & Metabolism II	23
<b>Apr 22</b>	The Immune System I	24
	The Immune System II	24
	Reproduction & Development I	26
<b>Apr 29</b>	Reproduction & Development II	26
	Reproduction & Development III	26
<b>May 6</b>	<b><i>Exam #4, TBA</i></b>	

### ***Tentative Laboratory Schedule***

<b>Week</b>	<b>Laboratory</b>
<b>Jan 21</b>	Laboratory 1. Orientation, Study the external and internal Organization of an animal (earthworm), and Introduction to Nerve Cell Recordings.
<b>Jan 28</b>	Laboratory 2. Action Potentials in Earthworms
<b>Feb 4</b>	Laboratory 3. Simulation of Neuronal Activity - Membrane Potential, Action Potentials and Synaptic Connectivity
<b>Feb 11</b>	Laboratory 4. Sensory Physiology: Somatosensory Systems
<b>Feb 18</b>	Laboratory 5. Sensory Physiology: Vision and Hearing
<b>Feb 25</b>	Laboratory 6. Muscles, Movement, and Control.
<b>Mar 4</b>	Laboratory 7. Cardiovascular Physiology I
<b>Mar 18</b>	Laboratory 8. Cardiovascular Physiology II
<b>Mar 25</b>	Laboratory 9. Respiratory Physiology
<b>Apr 1</b>	Laboratory 10. Human Renal Physiology and Active Transport in Insect Malpighian Tubules

### **Academic Misconduct and Dishonesty:**

**Academic misconduct will not be tolerated.** You have signed a contract with the university regarding this. It behooves you to be aware of its terms, as our duty (and contract) requires us to take action upon identifying transgressions. Please see the following website for a complete listing of what constitutes academic misconduct at Illinois State University:

<http://deanofstudents.illinoisstate.edu/conflict/conduct/code/academic.php>

For example: For students caught engaging in academic misconduct, a punishment ranging from an automatic 20% deduction to no credit for the assignment will be assessed based upon the seriousness of the infraction. The students will be reported to the Dean of Students. *Plagiarism* will not be tolerated. If a student has been caught plagiarizing material without proper citation, copying from another student, or cheating, the offense will be reported. Students are expected to be honest in all academic work. A student's placement of his or her name on any academic exercise shall be regarded as assurance that the work is the result of the student's own thought, effort, and study. Students who have questions regarding issues of academic dishonesty should refer to the University regulation that outlines unacceptable behaviors in academic matters.

It is your and my responsibility to uphold the principles of Academic Integrity. Academic Integrity is an important part of this University and this course. Academic Integrity should be used in preparation of this course, in class time, regarding exams, and with regard to written assignments. In certain circumstances (such as cheating or plagiarism) faculty may be required to refer a student(s) to Community Rights & Responsibilities for a violation of Illinois State University's Code of Student Conduct. ***In short, we will not tolerate academic dishonesty under any circumstances. Academic Integrity is expected in all classroom endeavors.***

### **Syllabus Statement for Classroom Behavior:**

Students are expected to behave in a manner consistent with being in a professional environment. Open discussion and disagreement are ***encouraged*** in a respectful manner. Open hostility, rudeness, and incivility are discouraged and will result in appropriate action. Mechanical disruptions (cell phones, pagers, electronic toys, music players, etc.) are also strongly discouraged. Students acting in a disruptive or uncivil manner may be dismissed from the class for the remainder of the class period. If necessary, referrals may also be made to Community Rights & Responsibilities for violations of the Code of Student Conduct.

### **Incomplete/Withdrawal:**

Policies concerning the assignment of an incomplete and allowing for withdrawal from a course can be found in the Illinois State University Undergraduate Catalog. These guidelines will be followed.

### **Recording of Class and/or lectures sample statements:**

#### **Full Denial to record**

Students may not photograph or use audio or video devices to record classroom lectures or discussions or visual materials that accompany them (e.g., lecture slides, whiteboard notes/equations). Students with disabilities who need to record classroom lectures or discussions must contact Student Access and Accommodation Services to register, request and be approved for an accommodation. Students who violate this policy may be subject to both legal sanctions for violations of copyright law and disciplinary action under the University's Code of Student Conduct.

**Permission required to record**

Students must obtain written permission from the instructor if they wish either to photograph classroom lectures or discussions or to record them using audio or video devices. This restriction includes visual materials that accompany the lecture/discussion, such as lecture slides, whiteboard notes/equations, etc. Such recordings are to be used solely for the purposes of individual or group study with other students enrolled in the class. They may not be reproduced, shared in any way (including electronically or posting in any web environment) with those not in the class. Students with disabilities who need to record classroom lectures or discussions must contact Student Access and Accommodation Services to register, request and be approved for an accommodation. Students who violate this policy may be subject to both legal sanctions for violations of copyright law and disciplinary action under the University's Code of Student Conduct.

**Campus Safety and Security:**

Illinois State University is committed to maintaining a safe environment for the University community. Please take a few moments to make sure you are signed up for ISU Emergency Alerts at [IllinoisState.edu/EmergencyAlert](http://IllinoisState.edu/EmergencyAlert). Also, note the information posted in each classroom about emergency shelters and evacuation assembly areas (both are indicated on stickers inside every classroom). Additional safety information is available on the Campus Safety and Security website, [Security.IllinoisState.edu](http://Security.IllinoisState.edu).