

Bio 4023: Advanced Human Physiology  
3 units  
Bio 4023L: Advanced Human Physiology lab  
1 unit  
Point Loma Nazarene University  
Fall 2022

<b>instructor:</b>	Dr. Rebecca J. Flietstra
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<b>lecture time/location:</b>	MWF: 8:30—9:25 a.m. Ryan Learning Center 106
<b>laboratory time/location:</b>	Th, 8:30—11:00 Rohr Science 165
<b>office hours:</b>	MWF: 1:00—3:00 p.m.

I want you to do well in this course. Towards that goal, I encourage questions during lectures and labs. If you have questions outside of class, feel free to email me. I can email an answer or set up a zoom meeting. I prefer to meet during office hours, but can meet at other times, depending on my schedule.

### Course Description:

This course examines how different organ systems work and interact with each other to maintain homeostasis in the human body. The course specifically examines metabolism, the digestive system, the nervous system, the endocrine system, locomotion, respiration, the cardiovascular system, and the urinary system. 3 units

### Co-requisite: Bio 4023L

This advanced human physiology laboratory is a co-requisite for Bio 4023. Students enrolled in Bio 4023 must be enrolled in Bio 4023L, and vice versa. If Bio 4023 is dropped, Bio 4023L must also be dropped. Offered every year. Letter graded. 1 unit

### Prerequisites: Biology 2012 and Chemistry 2094:

According to the university catalog Bio 2012 *Organismal Biology* and Che 2094 *Organic Chemistry I* (or their equivalents) are prerequisites for Advanced Human Physiology.

### Student Learning Outcomes:

1. You will understand and explain the basic physiology of the human body's systems (metabolism, digestive, nervous, endocrine, locomotor, respiratory, cardiovascular, urinary).
2. You will be able to articulate how a disruption in one body system can adversely affect the function of another body system.
3. You will be able to read, analyze and report on papers from the primary literature.
4. You will be able to carry out, analyze and write up laboratory experiments.

### Required Text:

Silverthorn, *Human Physiology*, 7<sup>th</sup> ed (Pearson, 2015).

Journal articles for discussion; information about accessing these documents will be posted in Canvas (canvas.pointloma.edu).

### Studying:

It is highly recommended that you **study at least 2-3 hours for every lecture hour**. Since Bio 4023 + Bio 4023L are worth four credits, **you should be studying 8-12 hours every single week, throughout the week**—and not just the week prior to an exam. While studying includes reading the assigned text, you should concentrate on the lecture material presented in class. Make sure that you

both **memorize** the information and **understand** the material. Various study tips will be given in class throughout the semester.

Do not use any study materials from students who have previously taken this class. This includes notes, exams, presentations, essays and laboratory write-ups.

### Laptop Policy:

On occasion, we will use laptop computers in the lab. In the classroom, however, laptops tend to interfere with your education and can serve as a distraction for your neighbors. Numerous studies (some highlighted here) have confirmed that classroom laptop use can be detrimental to learning. For this reason, I do not allow the use of laptops or other electronic devices in the classroom, with the exception of exams.

1. Laptops and other electronic devices enable more than just note-taking, introducing numerous distractions (web-surfing, homework for other classes, social media, etc.) for you and your neighbors. You may think that you can multitask, but studies show you can't.  
[http://www.slate.com/articles/health\\_and\\_science/science/2013/05/multitasking\\_while\\_studying\\_divided\\_attention\\_and\\_technological\\_gadgets.html](http://www.slate.com/articles/health_and_science/science/2013/05/multitasking_while_studying_divided_attention_and_technological_gadgets.html)
2. As already mentioned, using your laptop in class can be less than neighborly. Your classmates' grades can also suffer due to the distracting pull of the laptop.  
<https://www.sciencedirect.com/science/article/pii/S0360131512002254>
3. Writing is a more effective way of learning material than is typing. With typing, each letter is pretty much the same thing for the brain. Writing, however, uses different muscle groups with each word and encourages the brain to integrate material during the writing process. Typing may be easy and fast, but by making the brain passive, it discourages learning.  
<https://www.npr.org/2016/04/17/474525392/attention-students-put-your-laptops-away>
4. Using electronic devices in class also impairs long-term retention, with one study suggesting that cellphone use in class can lower one's grade by half a letter grade.  
<https://www.insidehighered.com/news/2018/07/27/class-cellphone-and-laptop-use-lowers-exam-scores-new-study-shows>

### Journal Articles

As indicated on the schedule, during the semester you will be responsible for reading several assigned journal articles. Specific questions will be assigned with each article. You will be responsible for typing up and submitting the answers via Canvas (canvas.pointloma.edu) to these questions prior to the date of discussion. Credit for this assignment requires (1) typed answers submitted on time, (2) attendance on day of discussion, and (3) timely submission of written feedback.

### Exams:

Exams will be administered during the laboratory times, on the dates indicated in the schedule. If an exam needs to be rescheduled due to an illness or a school-related activity, students must notify me **in advance** of the need to reschedule the exam. **The final exam cannot be rescheduled.**

Exams will be administered on Canvas, using Honorlock. You will need to take your laptop to class for each exam. Unless given special permission (such as taking the exam through the EAC), you will not receive credit for an exam taken remotely. If you do not have a laptop, notify Dr. Flietstra as soon as possible so you can borrow a department laptop.

### Laboratory Participation:

It is **not** possible to schedule make-up labs. Come prepared for the laboratory exercise by reading the materials supplied ahead of time. Laboratory exercises will be posted to Canvas (canvas.pointloma.edu) at least two days prior to the lab. If possible, save a tree by printing these handouts as double-sided copies.

- ☠ **No food (including gum) or drinks in the laboratory.** This includes when you are in the lab for lecture exams.
- ↗ At the end of each laboratory period make sure that your table, and the equipment you've used, has been **cleaned and all materials returned to its appropriate place**. Points will be deducted for messes not cleaned up.

Laboratory assignments will be due as announced in lab.

- ↗ **You will not be allowed to hand in a laboratory write-up for a lab you did not attend.** In general, laboratory write-ups will need to be typed.
- ↗ Late lab write-ups will not receive full credit.
- ↗ Be sure that when you are asked to write up an individual laboratory report that this report reflects your own work, and not someone else's. This means that you can discuss the assignment with your classmates, but that you cannot copy their answers. Students who hand in identical assignments will not be given any credit for that particular assignment.

## Evaluation:

### Based on an expected 650+ total points

Following each exam, I will provide an update on the total points you have earned up until that point, along with the total possible points. I will not post your grades on Canvas. Instead, I expect that you can calculate your own grade based on the quizzes, exams, and assignments that have been returned.

Your grade for Bio 4023 and Bio 4023L will be calculated together and the same grade applied to both.

- 300 points—3 exams (100 points/exam)
- 100 points—final, cumulative exam
- 150 points—journal articles (4 articles)
  - 60 points—reading and answering questions (15 points/article)
  - 15 points—evaluating presentations
  - 75 points—group presentation
- 100 points for laboratory write-ups
- other assignments may be given in class as deemed appropriate

### Your letter grade will be determined from your cumulative percent score as follows:

<b>A:</b> 93.0—100%	<b>B-:</b> 80.0—82.99	<b>D+:</b> 67.0—69.99
<b>A-:</b> 90.0—92.99	<b>C+:</b> 77.0—79.99	<b>D:</b> 63.0—66.99
<b>B+:</b> 87.0—89.99	<b>C:</b> 73.0—76.99	<b>D-:</b> 60.0—62.99
<b>B:</b> 83.0—86.99	<b>C-:</b> 70.0—72.99	<b>F:</b> ≤ 59.99

## Other Academic Issues:

### PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

### PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center ([EAC@pointloma.edu](mailto:EAC@pointloma.edu) or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

### PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation.

### SEXUAL MISCONDUCT AND DISCRIMINATION

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix)

**To Teach ~ To Shape ~ To Send** Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Tentative Lecture Schedule		
<b>Aug 30 (Tu)</b>	Introduction to Physiology	chp. 1
<b>Aug 31 (W)</b>	Molecular Interactions	chp. 2
<i>Sep 1 (Th)</i>	<i>Lab: Get Acquainted Meetings</i>	
<b>Sep 2 (F)</b>	Animal Research	
<b>Sep 5 (M)</b>	<b>LABOR DAY</b>	
<b>Sep 7 (W)</b>	Metabolism and Energy Balance—1	chp. 4 & 22
<i>Sep 8 (Th)</i>	<i>Lab: Metabolism and Temperature in Rats</i>	
<b>Sep 9 (F)</b>	Clinical Research	
<b>Sep 12 (M)</b>	Metabolism and Energy Balance—2	chp. 4 & 22
<b>Sep 14 (W)</b>	Metabolism and Energy Balance—3	chp. 4 & 22
<i>Sep 15 (Th)</i>	<i>Lab: Effects of Castration on Juvenile Male Rats—1</i>	
<b>Sep 16 (F)</b>	Membrane Dynamics—1	chp. 5 pp. 123-136
<b>Sep 19 (M)</b>	Membrane Dynamics—2	chp. 5 pp. 153-160
<b>Sep 21 (W)</b>	<b>FREE DAY</b>	
<i>Sep 22 (Th)</i>	<i>Lab: Exam 1</i>	
<b>Sep 23 (F)</b>	Communication, Integration, and Homeostasis	chp. 6
<b>Sep 26 (M)</b>	Introduction to the Endocrine System	chp. 7
<b>Sep 28 (W)</b>	Introduction to the Endocrine System	chp. 7
<i>Sep 29 (Th)</i>	<i>Lab: Journal Article #1</i>	
<b>Sep 30 (F)</b>	Neurons	chp. 8
<b>Oct 3 (M)</b>	Neurons	chp. 8
<b>Oct 5 (W)</b>	The Central Nervous System	chp. 9
<i>Oct 6 (Th)</i>	<i>Lab: Effects of Testosterone on Juvenile Male Rats—2</i>	
<b>Oct 7 (F)</b>	Sensory Physiology: Background [touch, chemical senses]	chp. 10
<b>Oct 10 (M)</b>	Sensory Physiology [inner ear: balance and hearing]	chp. 10
<b>Oct 12 (W)</b>	Sensory Processes [vision]	chp. 10
<i>Oct 13 (Th)</i>	<i>Lab: Journal Article #2</i>	
<b>Oct 14 (F)</b>	Autonomic Nervous System	chp. 11
<b>Oct 17 (M)</b>	Muscles	chp. 12
<b>Oct 19 (W)</b>	<b>FREE DAY</b>	
<i>Oct 20 (Th)</i>	<i>Lab: Exam 2</i>	
<b>Oct 21 (F)</b>	<b>HOLIDAY: FALL BREAK</b>	
<b>Oct 24 (M)</b>	Muscles	chp. 12
<b>Oct 26 (W)</b>	Cardiovascular Physiology	chp. 14
<i>Oct 27 (Th)</i>	<i>Lab: Sheep Brain and Sheep Heart dissections</i>	

<b>Oct 28 (F)</b>	Cardiovascular Physiology	chp. 14
<b>Oct 31 (M)</b>	Blood Flow and Blood Pressure	chp. 15
<b>Nov 2 (W)</b>	Blood	chp. 16
<i>Nov 3 (Th)</i>	<i>Lab: Journal Article #3</i>	
<b>Nov 4 (F)</b>	Mechanics of Breathing	chp. 17
<b>Nov 7 (M)</b>	Gas Exchange and Transport	chp. 18
<b>Nov 9 (W)</b>	The Kidneys	chp. 19
<i>Nov 10 (Th)</i>	<i>Lab: Weight of the Nation</i>	
<b>Nov 11 (F)</b>	The Kidneys	chp. 19
<b>Nov 14 (M)</b>	Fluid and Electrolyte Balance	chp. 20
<b>Nov 16 (W)</b>	<b>FREE DAY</b>	
<i>Nov 17 (Th)</i>	<i>Lab: Exam 3</i>	
<b>Nov 18 (F)</b>	Digestive System	chp. 21
<b>Nov 21 (M)</b>	Digestive System	chp. 21
<b>Nov 23-25</b>	<b>HOLIDAY: THANKSGIVING BREAK</b>	
<b>Nov 28 (M)</b>	Immune System	chp. 24
<b>Nov 30 (W)</b>	Diabetes Mellitus	
<i>Dec 1 (Th)</i>	<i>Lab: Journal Article #4</i>	
<b>Dec 2 (F)</b>	Reproduction [Sexual differentiation]	chp. 25
<b>Dec 5 (M)</b>	Reproduction [Male physiology]	chp. 25
<b>Dec 7 (W)</b>	Reproduction [Female physiology]	chp. 25
<i>Dec 8 (Th)</i>	<i>Lab: No Lab</i>	
<b>Dec 9 (F)</b>	Reproduction [Pregnancy and Lactation]	chp. 25
<b>Dec 12 (M)</b>	<b>FINAL EXAM, 7:30—10:00a.m.</b>	