

Biology Department  
Fall 2024

**Bio 4023: Advanced Human Physiology**

3 units

RLC 104: MWF 8:30 a.m.—9:25 a.m.

**Bio 4023L: Advanced Human Physiology lab**

1 unit

Sator 117: F 2:45—5:45 p.m.

Final Exam: December 20 (F), 7:30 a.m.—10:00 a.m.

<b>instructor:</b>	Dr. Rebecca J. Flietstra
<b>office:</b>	1 <sup>st</sup> floor Rohr Science in the Biology Department Suite
<b>e-mail:</b>	rflietst@pointloma.edu
<b>office hours:</b>	MW: 1:00—3:00 p.m. F: 1:00—2:30 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 or just stop by my office. 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.

**Course 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 and Equipment:**

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).

Safety glasses required for dissection labs

## 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.

**Except for class notes, do not use any study materials from students who have previously taken this class. This includes 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>  
<https://www.npr.org/sections/health-shots/2024/05/11/1250529661/handwriting-cursive-typing-schools-learning-brain>
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. You should use **Google Chrome** browser to access Canvas and Honorlock during the exam. Unless given special permission (such as taking the exam through the EAC), you will not receive credit for an exam taken remotely.

### Final Examination Policy:

Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the Final Exam Schedules site:

<http://www.pointloma.edu/experience/academics/class-schedules>. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

### 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](http://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 615 total points

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
- 145 points—journal articles (4 articles)
  - 60 points—reading and answering questions (15 points/article)
  - 10 points—evaluating presentations
  - 75 points—group presentation
- 70 points for laboratory participation and 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:

---

### **CONTENT WARNING**

---

I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive various types of information. In Bio 4023 all the class content, including that which may be intellectually or emotionally challenging, has been intentionally curated to achieve the learning goals for this course. The decision to include such material is not taken lightly. These topics include several diseases which may have affected you, family members or friends. If you encounter a topic that is intellectually challenging for you, it can manifest in feelings of discomfort and upset. In response, I encourage you to come talk to me or your friends or family about it. Class topics are discussed for the sole purpose of expanding your intellectual engagement in Advanced Human Physiology and I will support you throughout your learning in this course.

### **SPIRITUAL CARE**

---

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith. If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the [Office of Spiritual Development](#).

### **STATE AUTHORIZATION**

---

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

### **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 RECORDING NOTIFICATION**

---

PLNU Recording Notification In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel. Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

### **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.

### **ARTIFICIAL INTELLIGENCE (AI) POLICY**

---

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc.) to generate ideas, but you are not allowed to use AI tools to

**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.

generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.

## **PLNU ACADEMIC ACCOMMODATIONS POLICY**

---

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). 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 work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. The EAC makes accommodations available to professors at the student's request.

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. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

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. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any special accommodations.

## **LANGUAGE AND BELONGING**

---

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.

If you (or someone you know) have experienced a bias incident regarding language, you can find more information on reporting and resources at [www.pointloma.edu/bias](http://www.pointloma.edu/bias).

## **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 <http://pointloma.edu/title-ix>.

If you (or someone you know) have experienced other forms of discrimination or bias, you can find more information on reporting and resources at [www.pointloma.edu/bias](http://www.pointloma.edu/bias)

## **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 withdrawal date or, after that date, receive an "F" grade.

<b>Tentative Lecture and Lab Schedule</b>		
<b>Sept 2 (M)</b>	<b>LABOR DAY</b>	
<b>Sept 4 (W)</b>	Introduction to Physiology	chp. 1
<b>Sept 6 (F)</b>	Molecular Interactions	chp. 2
<i>Sept 6 (F)</i>	<i>Lab: Get Acquainted Meetings</i>	
<b>Sept 9 (M)</b>	Animal Research	
<b>Sept 11 (W)</b>	Clinical Research	
<b>Sept 13 (F)</b>	Metabolism and Energy Balance—1	chp. 4 & 22
<i>Sept 13 (F)</i>	<i>Lab: Metabolism and Temperature in Rats</i>	
<b>Sept 16 (M)</b>	Metabolism and Energy Balance—2	chp. 4 & 22
<b>Sept 18 (W)</b>	Metabolism and Energy Balance—3	chp. 4 & 22
<b>Sept 20 (F)</b>	Membrane Dynamics—1	chp. 5 pp. 123-136
<i>Sept 20 (F)</i>	<i>Lab: Effects of Castration on Juvenile Male Rats—1</i>	
<b>Sept 23 (M)</b>	Membrane Dynamics—2	chp. 5 pp. 153-160
<b>Sept 25 (W)</b>	Communication, Integration, and Homeostasis	chp. 6
<b>Sept 27 (F)</b>	<b>NO LECTURE</b>	
<i>Sept 27 (F)</i>	<i>Lab: Exam 1</i>	
<b>Sept 30 (M)</b>	Introduction to the Endocrine System	chp. 7
<b>Oct 2 (W)</b>	Introduction to the Endocrine System	chp. 7
<b>Oct 4 (F)</b>	Neurons	chp. 8
<i>Oct 4 (F)</i>	<i>Lab: Journal Article #1</i>	
<b>Oct 7 (M)</b>	Neurons	chp. 8
<b>Oct 9 (W)</b>	The Central Nervous System	chp. 9
<b>Oct 11 (F)</b>	Sensory Physiology: Background [touch, chemical senses]	chp. 10
<i>Oct 11 (F)</i>	<i>Lab: Effects of Testosterone on Juvenile Male Rats—2</i>	
<b>Oct 14 (M)</b>	Sensory Physiology [inner ear: balance and hearing]	chp. 10
<b>Oct 16 (W)</b>	Sensory Processes [vision]	chp. 10
<b>Oct 18 (F)</b>	Autonomic Nervous System	chp. 11
<i>Oct 18 (F)</i>	<i>Lab: Journal Article #2</i>	
<b>Oct 21 (M)</b>	Muscles	chp. 12
<b>Oct 23 (W)</b>	Muscles	chp. 12
<b>Oct 25 (F)</b>	<b>HOLIDAY: FALL BREAK</b>	
<i>Oct 25 (F)</i>	<i>Lab: Fall Break</i>	
<b>Oct 28 (M)</b>	Cardiovascular Physiology	chp. 14
<b>Oct 30 (W)</b>	Cardiovascular Physiology	chp. 14
<b>Nov 1 (F)</b>	<b>NO LECTURE</b>	
<i>Nov 1 (F)</i>	<i>Lab: Exam 2</i>	
<b>Nov 4 (M)</b>	Blood Flow and Blood Pressure	chp. 15
<b>Nov 6 (W)</b>	Blood	chp. 16
<b>Nov 8 (F)</b>	Mechanics of Breathing	chp. 17
<i>Nov 8 (F)</i>	<i>Lab: Sheep Brain and Sheep Heart dissections</i>	

<b>Nov 11 (M)</b>	Gas Exchange and Transport	chp. 18
<b>Nov 13 (W)</b>	The Kidneys	chp. 19
<b>Nov 15 (F)</b>	The Kidneys	chp. 19
<i>Nov 15 (F)</i>	<i>Lab: Journal Article #3</i>	

<b>Nov 18 (M)</b>	Fluid and Electrolyte Balance	chp. 20
<b>Nov 20 (W)</b>	Digestive System	chp. 21
<b>Nov 22 (F)</b>	<b>NO LECTURE</b>	
<i>Nov 22 (F)</i>	<i>Lab: Exam 3</i>	

<b>Nov 25 (M)</b>	Digestive System	chp. 21
<b>Nov 27-29</b>	<b>HOLIDAY: THANKSGIVING BREAK</b>	

<b>Dec 2 (M)</b>	Immune System	chp. 24
<b>Dec 4 (W)</b>	Diabetes Mellitus	
<b>Dec 6 (F)</b>	Reproduction [Sexual differentiation]	chp. 25
<i>Dec 6 (F)</i>	<i>Lab: Journal Article #4</i>	

<b>Dec 9 (M)</b>	Reproduction [Male physiology]	chp. 25
<b>Dec 11 (W)</b>	Reproduction [Female physiology]	chp. 25
<b>Dec 13 (F)</b>	Reproduction [Pregnancy and Lactation]	chp. 25
<i>Dec 13 (F)</i>	<i>Lab: No Lab</i>	

<b>Dec 20 (F)</b>	<b>FINAL EXAM, 7:30—10:00a.m.</b>	
-------------------	-----------------------------------	--