

Bio 4023: Advanced Human Physiology
3 units
Bio 4023L: Advanced Human Physiology lab
1 unit
Point Loma Nazarene University
Fall 2021

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| instructor: | Dr. Rebecca J. Flietstra |
| office: | 182 Rohr Science |
| phone: | x2718 [619.849.2718] |
| e-mail: | RebeccaFlietstra@pointloma.edu |
| lecture time/location: | MWF: 8:30—9:25 a.m. Latter Hall 102 |
| laboratory time/location: | Th, 8:30—11:00 Rohr Science 165 |
| office hours: | MWF: 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. 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*, 7th 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.

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.

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
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:

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

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.

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 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.

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](#).

| Tentative Lecture Schedule | | |
|-----------------------------------|---|--------------------|
| Aug 31 (Tu) | Introduction to Physiology | chp. 1 |
| Sept 1 (W) | Molecular Interactions | chp. 2 |
| <i>Sept 2 (Th)</i> | <i>Lab: Get Acquainted Meetings</i> | |
| Sept 3 (F) | Animal Research | |
| Sept 6 (M) | LABOR DAY | |
| Sept 8 (W) | Metabolism and Energy Balance—1 | chp. 4 & 22 |
| <i>Sept 9 (Th)</i> | <i>Lab: Metabolism and Temperature in Rats</i> | |
| Sept 10 (F) | Clinical Research | |
| Sept 13 (M) | Metabolism and Energy Balance—2 | chp. 4 & 22 |
| Sept 15 (W) | Metabolism and Energy Balance—3 | chp. 4 & 22 |
| <i>Sept 16 (Th)</i> | <i>Lab: Effects of Castration on Juvenile Male Rats—1</i> | |
| Sept 17 (F) | Membrane Dynamics—1 | chp. 5 pp. 123-136 |
| Sept 20 (M) | Membrane Dynamics—2 | chp. 5 pp. 153-160 |
| Sept 22 (W) | FREE DAY | |
| <i>Sept 23 (Th)</i> | <i>Lab: Exam 1</i> | |
| Sept 24 (F) | Communication, Integration, and Homeostasis | chp. 6 |
| Sept 27 (M) | Introduction to the Endocrine System | chp. 7 |
| Sept 29 (W) | Introduction to the Endocrine System | chp. 7 |
| <i>Sept 30 (Th)</i> | <i>Lab: Journal Article #1</i> | |
| Oct 1 (F) | Neurons | chp. 8 |
| Oct 4 (M) | Neurons | chp. 8 |
| Oct 6 (W) | The Central Nervous System | chp. 9 |
| <i>Oct 7 (Th)</i> | <i>Lab: Effects of Testosterone on Juvenile Male Rats—2</i> | |
| Oct 8 (F) | Sensory Physiology: Background [touch, chemical senses] | chp. 10 |
| Oct 11 (M) | Sensory Physiology [inner ear: balance and hearing] | chp. 10 |
| Oct 13 (W) | Sensory Processes [vision] | chp. 10 |
| <i>Oct 14 (Th)</i> | <i>Lab: Journal Article #2</i> | |
| Oct 15 (F) | Autonomic Nervous System | chp. 11 |
| Oct 18 (M) | Muscles | chp. 12 |
| Oct 20 (W) | FREE DAY | |
| <i>Oct 21 (Th)</i> | <i>Lab: Exam 2</i> | |
| Oct 22 (F) | HOLIDAY: FALL BREAK | |
| Oct 25 (M) | Muscles | chp. 12 |
| Oct 27 (W) | Cardiovascular Physiology | chp. 14 |
| <i>Oct 28 (Th)</i> | <i>Lab: Sheep Brain and Sheep Heart dissections</i> | |

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| Oct 29 (F) | Cardiovascular Physiology | chp. 14 |
| Nov 1 (M) | Blood Flow and Blood Pressure | chp. 15 |
| Nov 3 (W) | Blood | chp. 16 |
| <i>Nov 4 (Th)</i> | <i>Lab: Journal Article #3</i> | |
| Nov 5 (F) | Mechanics of Breathing | chp. 17 |
| Nov 8 (M) | Gas Exchange and Transport | chp. 18 |
| Nov 10 (W) | The Kidneys | chp. 19 |
| <i>Nov 11 (Th)</i> | <i>Lab: Weight of the Nation</i> | |
| Nov 12 (F) | The Kidneys | chp. 19 |
| Nov 15 (M) | Fluid and Electrolyte Balance | chp. 20 |
| Nov 17 (W) | FREE DAY | |
| <i>Nov 18 (Th)</i> | <i>Lab: Exam 3</i> | |
| Nov 19 (F) | Digestive System | chp. 21 |
| Nov 22 (M) | Digestive System | chp. 21 |
| Nov 24-26 | HOLIDAY: THANKSGIVING BREAK | |
| Nov 29 (M) | Immune System | chp. 24 |
| Dec 1 (W) | Diabetes Mellitus | |
| <i>Dec 2 (Th)</i> | <i>Lab: Journal Article #4</i> | |
| Dec 3 (F) | Reproduction [Sexual differentiation] | chp. 25 |
| Dec 6 (M) | Reproduction [Male physiology] | chp. 25 |
| Dec 8 (W) | Reproduction [Female physiology] | chp. 25 |
| <i>Dec 9 (Th)</i> | <i>Lab: No Lab</i> | |
| Dec 10 (F) | Reproduction [Pregnancy and Lactation] | chp. 25 |
| Dec 17 (F) | FINAL EXAM, 7:30—10:00a.m. | |