Biology 1040: Human Anatomy and Physiology 2
section 1
3 units
Bio 1040L: Human Anatomy and Physiology 2 lab
sections 1a, 1b, 1c
1 unit
Point Loma Nazarene University
Spring 2020

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lecture time/location:	Latter 01 MWF: 11:00 a.m.—11:55 a.m
laboratory time/location:	Sator Hall 117
	section 1a: Tu, 7:45 a.m.—10:45 a.m.
	section 1b: Tu, 10:55 a.m.—1:55 p.m.
	section 1c: Tu, 2:05 p.m.—5:05 p.m.
office hours:	MWF: 8:30—9:30 am 1:00—2:30 p.m.

If you have any questions about the material in this course, feel free to stop by during my office hours as listed above. Either set up an appointment or simply drop by. I may also be in my office at other, unscheduled times. If my office hours don't work for your schedule, e-mail or stop by and we can try to find a workable time to talk.

Course Description: Bio 1040
The second semester of a sequence which examines the human body from an integrated perspective emphasizing the interrelationship of structure and function. Topics include sensory and autonomic nervous system, endocrine system and reproduction, cardiovascular system, immune system, respiratory system, digestive system, and urinary system. 3 units

Co-requisite: Bio 1040L
This anatomy and physiology laboratory is a co-requisite for Bio 1040. Students enrolled in Bio 1040 must be enrolled in Bio 1040L, and vice versa. If Bio 1040 is dropped, Bio 1040L must also be dropped. Offered every year. Letter graded. Your grade for Bio 1040 and Bio 1040L will be calculated together and the same grade applied to both. 1 unit

Pre-requisites:
Successful completion (with a passing grade) of **Bio 1030,** and **Che 1003 or Che 1052** (or their equivalent) is a **prerequisite** to admission to this course. If you failed either one of these, you are not eligible to enroll in Bio 1040. This course is the second of a two-semester sequence where the structure and function of various systems of the body are studied in an integrated fashion. If you did not take Biology 1030 at PLNU, you should see me to be sure that your background is appropriate for this course.

Student Learning Outcomes:
1. Students will be able to identify the anatomy of, and blood flow through, the mammalian heart.
2. Students will be able to identify major blood vessels of the human and the cat, and the regions supplied by these blood vessels.
3. Students will understand the basic anatomy and physiology of the sensory and autonomic nervous systems, endocrine system, cardiovascular system, immune system, respiratory system, digestive system, and urinary system.
4. Students will be able to describe the symptoms and mechanisms of representative diseases and injuries, and explain how such pathophysiology relates to normal anatomy and physiology.

Required Texts and Materials:

For each lecture there is an assigned reading. It is recommended that you read through these pages both prior to and following the related lecture. The textbook for this class will be used both semesters of the Human Anatomy and Physiology sequence (Bio 1030 & Bio 1040); the dissection kit is also used both semesters.

- Amerman, *Human Anatomy and Physiology* (2nd ed.), Pearson, 2019.
  Bundled with *Mastering A&P*

The following materials are required for work in various laboratories:

- Dissecting kit (available at bookstore)
- Old shirt or coat for dissecting work

For this course you will need to access two websites:

- Canvas.pointloma.edu
  This website will be your source for all lecture and laboratory handouts.
- www.masteringaandp.com
  This website is available through your textbook—either included in the price of a new textbook, or a separate purchase with a used textbook. This website will serve as a resource for images and study guides, as well as the site you will use to access on-line quizzes.

Recommended Materials

These two items are for sale at the bookstore and may be helpful for learning the anatomical material this semester and next semester.

- Krieger, A Visual Analogy Guide to Human Anatomy & Physiology, Morton, 2013
- Hansen, *Netter's Anatomy Coloring Book*, Elsevier, 2010.

Evaluation:

based on an expected <u>1200+ total points</u>

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. At other times, I will expect that you can calculate your own grade based on the quizzes, exams, and assignments that have been returned. Quizzes, tests and class assignments will be returned to you via a folder binder that is passed around the classroom. Occasionally lab material may be returned this way as well. Please make sure you only remove your own materials from this folder.

Your grade for Bio 1040 and Bio 1040L will be calculated together and the same grade applied to both.

Lecture points: at least 840 points

1) 5 non-cumulative exams (100 points/exam) = 500 points
2) 6 in-class quizzes (15 points/quiz) = 90 points
3) 20-25 on-line quizzes (5 points/quiz) = 100-125 points
3) one final, cumulative exam = 150 points
4) up to 50 points possible from unannounced in-class assignments

Laboratory points: 360 points

1) 11 lab quizzes (10 points/quiz + 10 points) = 120 points
2) 7 lab exercises (20 points/exercise) = 140 points
3) circulatory system lab practical = 100 points

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

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

Extra Credit:

45 points—Although you only need to take six quizzes for class credit, up to nine quizzes (each worth 15 points) will be administered during the semester. When calculating your grades, every third quiz will be

considered “extra credit”, as reflected in your cumulative score. By taking all of the quizzes (and doing well), you could potentially earn 135 points out of 90 points.

Lecture Participation:

Taking Notes:

For each topical section I will make an outline available on Canvas (canvas.pointloma.edu) at least two days prior to the first lecture for that topic. If possible, save a tree by printing these outlines as double-sided copies.

Studying:

It is highly recommended that you study at least 2-3 hours for every credit hour. Since Bio 1040 + Bio 1040L are worth four credits, **you should be studying 8—12 hours every single week**—and not just the week prior to an exam or practical. This studying should also be spread out during each week, not simply occurring before Friday’s quiz. While studying includes reading the assigned text, you should concentrate on the lecture material presented in class. Make sure that you not only ***memorize*** the information, but that you also ***understand*** the material.

Tutoring:

Tutors have been assigned to this class and they are available for individual and group tutoring.

On-Line Quizzes:

Unless you’ve purchased a different edition, your textbook comes with a free, 2-year access to Mastering A&P. If you are using a different version of the text, you will need to purchase this separately (MasteringAandP.com; choose Amerman, Human Anatomy & Physiology, 1e). This website is used both semesters in all sections of Bio 1030/Bio 1040.

Unless explicitly announced in class, every Monday and Wednesday of this semester you will need to take a simple 5-point on-line quiz. This quiz is intended to help you keep up with all the material we are covering in class. Each quiz may cover material from the day’s lecture, previous material, and even some textbook material that will not be covered in class (but may be covered on quizzes and exams). **Each quiz will be available from noon of Monday or Wednesday to 7:59 a.m. the next morning.**

For this semester, use the following to identify and correctly log-in to the site:

textbook	Amerman Human Anatomy @ Physiology 2nd edition
course name	Bio 1040 Flietstra 2020
course ID	MAP6299280

Although each quiz is open-book, it is highly recommended that you read the chapter associated with the day’s lecture ahead of time. Indeed, you will be better able to learn the material if these quizzes you first study the material, then try to take the quiz without referring to your notes or textbook.

Feel free to take notes while you take these quizzes, but please DO NOT copy down questions and their answers, and DO NOT share answers with other members of the class. These quizzes are intended to help you and your classmates learn the material, so please do not undermine this goal by cheating.

In-Class Quizzes:

On the Fridays that do not have an exam, a **15-point quiz** will be administered at the start of class. These quizzes will consist of short answer and essay questions. The material to be covered by each quiz will be announced on the previous Wednesday. For each quiz, **10-12 points** will cover new material and **3-5 points** will cover previously studied material. These quizzes have a time limit, so if you are late for class, you will have less time. These quizzes are **not** intended to give you “easy points”, but are designed to help **focus your studying**. In general, these quizzes will be returned and discussed on the following Monday.

Exams:

The dates on which exams will be administered are indicated in the lecture schedule below. Exams can only be rescheduled with advance notice and with a valid reason, such as illness (requiring a signed statement from a physician) or a school-related activity (requiring prior notification from the administration and the student). **The final cannot be rescheduled. This semester the final will be given on Monday, April 29, 10:30 a.m.—1:00 p.m.**

- Lecture exams will cover the material given in class up as indicated in the syllabus.
- Each exam will be composed of 40 multiple-choice questions (80 pts total) and 20 points of short answer/essay questions.
- Answers to the multiple-choice questions will be made available in lab after the tests have been returned. If you do not take time to look at the multiple choice questions at this time you will not be given another opportunity to review the answer key. **You are not to copy down the exam questions and answers**. Instead, use this opportunity to find out what areas you do not understand and need to further study. Remember, the final is cumulative.

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 devises in the classroom.

1. Laptops and other electronic devises 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 devises 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

Laboratory Participation:

Attendance:

Attendance is mandatory. You are expected to stay for the **entire scheduled laboratory period** unless dismissed by the instructor. If you do not attend or fail to complete the scheduled laboratory, you will not receive any credit for that particular lab. This penalty also applies to the dissection labs. Individuals who do not fully participate in the dissection labs will have 25 points subtracted from their lab practical score for each laboratory dissection period missed. If participation in a school-sponsored activity or illness prevents you from attending your scheduled lab section during a particular week you *might* be able to attend another lab section during that same week. Such a switch requires the **prior** permission of the lab instructor and should not be viewed as an automatic privilege.

Laboratory Handouts:

Prepare for the laboratory exercise by reading the materials supplied ahead of time. Laboratory exercises will be posted on Canvas (canvas.pointloma.edu) at least one week prior to the lab. If possible, save a tree by printing these lab hand-outs as double-sided copies.

Textbook and Lecture Notes:

The lab exercises and write-up often refer to material found in your textbook and in the lecture notes. Both sources, therefore, should be brought to lab each week.

Laboratory Quizzes:

As indicated on the lab schedule, quizzes will be administered at the start of most laboratory sections. If you are late for lab, you will not be given the opportunity to take any missed quiz.

Circulatory System Practical:

The circulatory system laboratory practical is scheduled for **Tuesday, March 3** and will be administered in the one-hour blocks during normal school hours. Prior to the exam, you will be asked to indicate which time(s) are amenable to your schedule. If you anticipate conflicts, please do your best to clear them prior to the circulatory system labs. The circulatory system laboratory practical will be worth **100 points**.

Laboratory Assignments:

Laboratory assignments will be due at the end of the lab period. You **cannot** hand in a laboratory write-up for a lab you did not attend. It is important that you recognize that these laboratory write-ups must **reflect your own work**, and not someone else's. This means that you can—and should—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.

Laboratory Safety and Clean-Up:

No food (including gum) or water in the laboratory.

Keep all backpacks and other personal materials either on the lab bench (if there is room) or completely under the lab bench, such that no one could possibly trip over these items.

Enclosed shoes are mandatory. Open-toed shoes, clogs, backless shoes, or sandals are not permitted. You also cannot wear shoes that expose the top of the foot.

At the end of each laboratory period make sure that your table, and the equipment you've used, has been **cleaned and returned** to its appropriate place. Points are deducted for messes not cleaned up.

Other Academic Issues:

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 Class Schedules site. No requests for early examinations or alternative days will be approved.

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

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in 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. See Academic Policies in the Undergraduate Academic Catalog.

PLNU Mission: 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.

Topic 1	Nervous System
Topic 2	Endocrine System
Topic 3	Cardiovascular System
Topic 4	Immune System
Topic 5	Respiratory System
Topic 6	Digestive System
Topic 7	Urinary System
Topic 8	Diabetes Mellitus

Tentative Lecture Schedule

Jan 14 (Tu)	Sensory Receptors; Spinal Reflexes *nervous system (382-383); neurons (384-387); spinal cord (455-459)*	chp. 13 pp. 497-504, 506-511
On Your Own	Categorizations of Sensory Receptors	
Jan 15 (W)	Autonomic Nervous System *brain divisions (426); cranial nerves (479-487); spinal cord (455-459)*	chp. 14 pp. 516-533
Jan 17 (F)	Chemical Senses: Gustation and Olfaction *cranial nerves (479-487)*	chp. 15 pp. 536-543
Jan 20 (M)	**Martin Luther King Day**	
Jan 22 (W)	Visual System *cranial nerves (479-487); motor units (368-369)*	chp. 15 pp. 544-562
Jan 24 (F)	Visual System *cranial nerves (479-487)*	chp. 15 pp. 544-562
Jan 27 (M)	Ear Anatomy *cranial nerves (479-487)*	chp. 15 pp. 562-577
Jan 29 (W)	Inner Ear Function: Hearing & Proprioception *cranial nerves (479-487)*	chp. 15 pp. 562-577
Jan 31 (F)	**EXAM 1** *Covers lecture material, on your own material and cranial nerves 1/14—1/27*	
Feb 3 (M)	Overview of Endocrine System *exocytosis (84); glands (135-137)*	chp. 16 pp. 584-592
Feb 5 (W)	Pituitary and Hypothalamus *diencephalon (433-435)*	chp. 16 pp. 593-600
Feb 7 (F)	Other Endocrine Glands *Ca^{++} homeostasis (203-204); sympathetic nervous system (519-526)*	chp. 16 pp. 601-621
Feb 10 (M)	Male Reproductive System *steroids (63); pituitary and hypothalamus (593-600)*	chp. 3 pp. 111-116 chp. 26 pp. 1022-1039
Feb 12 (W)	Female Reproductive System *steroids (63); pituitary and hypothalamus (593-600)*	chp. 26 pp. 1039-1058
Feb 14 (F)	**EXAM 2** *Covers lecture material 1/29—2/10*	
Feb 17 (M)	Heart Anatomy and Histology *membrane junctions (126-127); serous membrane (19-20); skeletal muscle fibers (148-149)*	chp. 17 pp. 630-646
Feb 19 (W)	Cardiac Cycle & Heart Electrical Properties *action potentials and skeletal muscle (347-358)*	chp. 17 pp. 647-661
Feb 21 (F)	Regulation of Cardiac Output *autonomic nervous system (510-533)*	chp. 17 pp. 662-666
Feb 24 (M)	Blood Vessels *histology (127-150)*	chp. 18 pp. 670-675, 687-692
Feb 26 (W)	Blood Flow and Blood Pressure *reflex arc (506)*	chp. 18 pp. 675-687
Feb 28 (F)	**EXAM 3** *Covers lecture material 2/12—2/24*	

Mar 2 (M)	**Free Day**	
Mar 3 (Tu)	**Lab Practical Exam—all sections**	
Mar 4 (W)	Blood *reversible reactions (42); osmosis (76-79); bone marrow (188)*	chp. 19 pp. 723-751
Mar 6 (F)	Blood *bone marrow (188)*	chp. 19 pp. 723-751

March 9—13	**Spring Break**	

Mar 16 (M)	Lymphatic System *osmosis (76-79)*	chp. 20 pp. 754-762
Mar 18 (W)	Innate Immunity *plasma membrane (70-74); phagocytosis (83); skin (160-173); hypothalamus (433)*	chp. 20 pp. 763-772 chp. 23 pp. 929-932
Mar 20 (F)	Adaptive Immunity *blood grouping & typing (746-750)*	chp. 20 pp. 772-787

Mar 23 (M)	Respiratory System Anatomy & Volumes *epithelial tissues & glands (127-137); cartilage (142-143); olfaction (537-540); autonomic nervous system (516-533)*	chp. 21 pp. 802-817, 825-827
On Your Own	Pulmonary Air Volumes and Capacities	
Mar 25 (W)	Ventilation *inflammation (768-771); autonomic nervous system (516-533); pH (47-50); reflex arcs (506)*	chp. 21 pp. 818-825, 840-843
Mar 27 (F)	**Exam 4** *Covers lecture and on your own material 2/26-3/23*	

Mar 30 (M)	Gas Exchange, O_2 transport *hemoglobin (726-727)*	chp. 21 pp. 827-835
Apr 1 (W)	CO_2, Respiratory Pathologies *pH (47-50)*	chp. 21 pp. 835-846
Apr 3 (F)	Digestive Processes; GI Anatomy *exocrine & endocrine glands (134-137); serous membranes (19-20)*	chp. 22 pp. 851-868, 872-876

Apr 6 (M)	Accessory Digestive Organs and Digestion *exocrine & endocrine glands (134-137); enzymes (43-45); pH (47-50); organic molecules (50-64)*;	pp. 861-864, 868-871, 879-894
Apr 8 (W)	Large Intestines; GI Pathologies *osmosis and tonicity (76-80)*	chp. 22 pp. 876-878
Apr 10 (F)	**Easter Break**	

Apr 13 (M)	**Easter Break**	
Apr 15 (W)	Urinary System Anatomy *membrane transport (80-82); capillaries (687-689)*	chp. 24 pp. 947-956
Apr 17 (F)	**Exam 5** *Covers lecture material 3/25-4/8*	

Apr 20 (M)	Urine Production *osmosis (76-80); capillaries (687-689)*	chp. 24 pp. 957-981
Apr 22 (W)	Regulation of Urine and Body Fluid *posterior pituitary (594-596); adrenal cortex (608-612)*	chp. 24 pp. 957-981 chp. 25 pp. 984-987
Apr 24 (F)	Urine Movement; Fluid Composition	chp. 24 pp. 970-971, 983-987 chp. 25 pp. 993-1007

Apr 27 (M)	pH Balance *pH (47-50); control of respiration (840-843)*	chp. 25 pp. 1008-1018
Apr 29 (W)	Pancreas and Diabetes Mellitus *pH (47-50); carbohydrates (51-52); oxygen transport (832-850); control of respiration (840-843); tubular reabsorption (967-971)*	chp. 16 pp. 614-618 chp. 22 pp. 879-880
May 1 (F)	Quiz only	

May 1 (W)	**FINAL EXAM** **10:30am—1:00pm**	

Cranial Nerves

I	Olfactory	Sensory	smell
II	Optic	Sensory	vision
III	Oculomotor	Motor	contracts medial rectus, superior rectus, inferior rectus, and inferior oblique muscles (eye) raises eyelid
		Parasympathetic	contracts intrinsic muscles of eye for near vision and pupil constriction
IV	Trochlear	Motor	contracts superior oblique muscle (eye)
V	Trigeminal	Sensory	touch from face/upper cranium
		Motor	moves mandible (chewing; speech)
VI	Abducens	Motor	contracts lateral rectus muscle (eye)
VII	Facial	Sensory	taste (anterior 2/3 of tongue)
		Motor	facial expression
		Parasympathetic	stimulates salivary glands and lacrimal glands
VIII	Vestibulocochlear	Sensory	hearing and position/movement of the head for balance
IX	Glossopharyngeal	Sensory	taste (posterior 1/3 of tongue)
		Motor	swallowing
		Parasympathetic	stimulates salivary glands
X	Vagus	Sensory	taste; sensory from thoracic & abdominal organs
		Motor	tongue and throat
		Parasympathetic	decreases heart rate; increases digestion
XI	Accessory	Motor	contracts sternocleidomastoid and trapezius
XII	Hypoglossal	Motor	contracts extrinsic and intrinsic muscles of tongue

Laboratory Schedule for Bio 1040, Spring 2020

Week of:	*Lab Exercise*	*Quiz*
Jan. 13-17	NO LAB	
Jan. 20-24	Reflexes, Sensory Receptors, and Cranial Nerves	*cranial nerves*
Jan. 27-31	Special Senses	*reflexes, sensory receptors, and cranial nerves*
Feb. 3-7	Circulatory System Anatomy: Sheep Heart Cat Veins	*special senses*
Feb. 10-14	Circulatory System Anatomy: Cat Thoracic Arteries Human Heart Model	*sheep heart & cat veins*
Feb. 17-21	Circulatory System Anatomy: Cat Abdominal Arteries Cat Organs Human Cerebral Arteries	***14 pt** quiz:* *cat thoracic arteries, human heart model & review (sheep heart and cat veins)*
Feb. 24-28	Circulatory System Anatomy: Review	***16 pt** quiz:* *cat organs & abdominal arteries, human arteries of neck and head, & review*
Mar. 2-6	**Laboratory Exam: Cardiovascular Practical** **Tuesday, March 3 for all sections** No Regularly Scheduled Laboratory Sections	
Mar. 9-13	**NO LAB—Spring Break**	
Mar. 16-20	Cardiovascular Physiology	*blood pressure*
Mar. 23-27	Diagnostic Blood Tests	*cardiovascular physiology*
Mar. 30-Apr. 3	Respiratory Physiology	*diagnostic blood tests*
Apr. 6-10	**NO LAB—Easter Break**	
Apr. 13-17	Osmosis and Tonicity	*respiratory physiology*
Apr. 20-24	Urinalysis	*osmosis and tonicity*
Apr. 22-26	NO LAB	