BI 121 Introduction to Human Physiology Syllabus
University of Oregon, Department of Biology
V. Pat Lombardi

Introduction: *Human Physiology* is the study and *science of function in humans*– how processes work at cell, organ, tissue and body system levels of organization or as Lauralee Sherwood says, what makes us tick! It is a wonderfully broad and demanding field that encompasses many disciplines including anatomy, animal physiology, biochemistry, cell biology, environmental and exercise physiology, histology, immunology, mathematics, medical physiology, molecular biology, nutrition, pathophysiology (the study of diseases), physics, and systems physiology! The focus varies based on the adjective used in front of the word *physiology*. For example, the goal of *comparative* physiology is to contrast functions across the animal kingdom. Exercise physiology studies adaptations to unique modes of exercise, primarily in humans. Environmental physiology investigates specific adaptations due to environmental stressors like high vs. low altitudes and cold vs. hot climates. Viral physiology or virology examines mechanisms in viruses, infectious, microscopic, genetic material in a protein coat, found in almost all ecosystems on earth. Certainly, there is much overlap among subdisciplines. Though we will discuss examples from many areas of physiology, our primary focus will be to study humans under normal, healthy conditions at the body systems level. Topic coverage includes homeostasis, basic cell physiology and genetics, and physiology of the gut, heart, vessels, blood, glands, brain, nerves, muscles and lungs. Nutrition and exercise physiology are incorporated with goals of making the material more applicable to daily activities and to promote optimal choices to enhance body awareness and health for a lifetime! Whatever your plans, ultimately my hope is that you enhance your appreciation and understanding of the intricate and miraculous nature of the human body!

Prerequisites: There are no prerequisites for BI 121 and those who are exploring or from any major are encouraged to enroll in the course. BI 121 helps U of O students satisfy their Natural Science Area of Inquiry requirement. However, because no assumptions are made about backgrounds in science or math and the course is taught largely to beginning, non-science majors at the 100-level, our approach will be more descriptive (what and where) and correlational (seeking how 2 or more variables are related) rather than mechanistic (how) and purpose-driven (why).

Objectives: By the end of the course, you should be able to complete these dozen learning objectives:
◦ describe the concept of homeostasis and identify key categories of variables balanced within the extracellular fluid compartment.
◦ apply a simplified homeostatic model to the regulation of unique input variables that ensure that body systems maintain homeostasis leading to cell survival.
◦ explain the basic structure and function of cells and cell organelles.
◦ compare and contrast anaerobic and aerobic metabolism and assign specific exercises to unique areas of the energy continuum.
◦ distinguish structures and functions of deoxyribonucleic and ribonucleic acids (DNA & RNA).
◦ discuss the flow of information from the nucleus to cytoplasm, from DNA to RNA to protein.

◦ paraphrase nutrition and exercise guidelines established by the US Government, the American Institute for Cancer Research, the American Heart Association and the American College of Sports Medicine.
◦ identify the common characteristics of the world's longest lived people in *Blue Zones*.
◦ analyze the nutrient content of your personal diet relative to national guidelines and make recommendations for self-improvement.
◦ articulate and debunk common myths about nutrition and exercise.
◦ summarize the basic structure and function of the gastrointestinal, cardiovascular, endocrine, nervous, skeletal muscular and respiratory systems.
◦ describe the physiology and inherent multi-organ risks of cigarette smoking and vaping.

Texts & References: BI 121 is designated as a low-cost course because all materials required cost less than 50 US dollars.

Lecture: You have a choice of textbooks for the lecture-discussion component of the course based on personal finances and your reading and studying styles. Below are the 2 choices:

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Sherwood's *Fundamentals* (called *the little book* because Dr. Sherwood wrote a more advanced physiology text at a higher level) is over 600 pages, while Chiras' book is more like a packet containing 170 pages. Sherwood's text also contains cell physiology and genetics sections whereas Chiras' book does not, as it is entirely at the body systems level. However, Chiras' book contains a short nutrition chapter, whereas Sherwood's does not. For nutrition, I will rely upon Sizer and Whitney's (S&W) *Nutrition Concepts & Controversies* and many other sources (see below nutrition links and course outline), but it is not necessary that you purchase any additional references beyond books by Sherwood and/or Chiras. Sherwood & Chiras options are both < 35.00 for digital version access. Sherwood's hard copy is far more expensive than Chiras'. Our lectures are in the middle between the lighter nature of Chiras and the more expanded details of Sherwood. Both are excellent writers.

If you are on-campus taking the course, we have many resources on reserve in the Price Science Commons Library. Super nutrition resources with free links are listed below. Please contact me directly if you have questions about resources.

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https://nutritionfacts.org/, *https://www.cspinet.org/eating-healthy*
https://www.hsph.harvard.edu/nutritionsource/
https://www.berkeleywellness.com/healthy-eating/nutrition
https://www.nutrition.gov/, *https://www.eatright.org*
https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics
https://www.aicr.org/cancer-prevention/, *https://mynutrition.wsu.edu/nutrition-basics*
https://www.nhlbi.nih.gov/health/educational/wecan/tools-resources/nutrition.htm
https://health.gov/our-work/food-nutrition, *https://www.nutritionletter.tufts.edu/*

+If you have access to the U of O campus, see also many supplemental reserved texts and resources in the Price Science Commons Library or the web listing: *http://libweb.uoregon.edu/*. Click on the **Course Reserves** tab, then sign in with U of O ID and password & type in *BI 121.*

Lab: The Lab Manual contains all of the background and the worksheets for our 6 labs. It is usually for sale at the U of O Duckstore (Bookstore) for ~10 US dollars, but for this term, it is free because I am posting the Lab Worksheets and Lab Backgrounds for you online on Canvas.

Lombardi VP, Evonuk E & Carmack MA (LM). *BI 121, Introduction to Human Physiology, Laboratory Manual, Fall 2020.* Supplied free as Lab Worksheets & Lab Backgrounds on Canvas.

Requirements:
◦ **Review the Lecture *.pdfs*, *.mp4s* and Active Learning Questions prior to attending online Lecture Discussions.** So that we are able to engage fully in a reverse classroom configuration, it is crucial that you review at least *.pdfs* and question prompts prior to coming to our online lecture discussions. The answers to the Active Learning Questions are within the *.pdfs* and *.mp4s* and are not found in many cases by cruising the internet. Seek course material 1st prior to doing internet searches reflexively. I worked very hard to make the posted *.mp4* recordings 25-35 min, though our Lecture Discussions are scheduled for much longer.
◦ **Review the Lab *.pdfs*, *.mp4s* and Lab Background material and Lab Worksheets prior to attending online Lecture Discussions.** Again, so that we are able to take full advantage of a reverse classroom design, it is crucial that you review at least *.pdfs* and question prompts prior to coming to our online lab discussions. The answers to the lab worksheet questions are within the *.pdfs*, *.mp4s* and background material and cannot be found in many cases through internet searches. Seek course materials 1st prior to conducting internet searches reflexively. Our live labs most often taken 50 – 60 min, but I did everything I could to reduce this time as much as possible for the posted *.mp4* recordings.
◦ **Read, take notes and study** the pages listed from your textbooks (LS, Lauralee Sherwood and/or DC, Daniel Chiras) on your course outline prior to the Lecture-Discussions and the same for your Lab Manual (LM) prior to your Lab-Discussions. Again, this will help foster discussion and facilitate the reverse classroom framework.
◦ Complete **Active Learning Questions** and submit by way of Canvas by 11:59:59 pm the night of the Lecture-Discussions.
◦ Complete **Lab Worksheets** and submit by way of Canvas by 11:59:59 pm the night of lab-discussions. The Nutrition Lab is one exception, as you have until the weekend to submit.
◦ Complete four online **Canvas Quizzes** covering all Active Learning Q and Lectures and Worksheets and Labs for the specific modules covered (see Course Outline for details).

Details:

Lecture and Lab Discussions are scheduled throughout the week and it is critical that you attend and participate. I will do my best to accommodate you given your unique schedules, work and other duties, and to help you out with any questions you might have. I know that several of you are in China and Europe and throughout the US, so in quite different time zones *https://www.timeanddate.com/worldclock/*! [The way I try to remember is Eugene + 8 hr = London and London + 8 hr = Tokyo! So Eugene + 16 hr = Tokyo!] Thus, if you need more help, I will be able to accommodate most of you in Europe, but will have to do extra odd times to help those in Japan and China and other parts of the world. Again, I will do my best.

All Active Learning Q, Lectures, Lab Worksheets and Labs will be posted by the preceding Friday on Canvas for the following week. All Active Learning Q for Lectures and Lab Worksheets for the Labs are to be submitted by way of Canvas. All Quizzes will be taken on Canvas and grades tabulated and available on Canvas.

You must do your best to focus and to keep up consistently with the work! Remember, the benefits you gain will be directly proportional to the efforts you invest!

Here is a quick review of requirements along with estimated time for completion:

1. **Review each Lecture *.pdf* and review the embedded links** so that you glean unique perspectives from articles, videos and other resources to help with your understanding. **Estimated time to complete = ~ 25 - 35 min**.
2. **Actively view and listen to each Lecture *.mp4* with video and audio.** These have been compressed to 25-35 min from the normal lecture time of more than double this! Be focused and looking for answers to the Active Learning Q that you may have not picked up through your reading and by reviewing the Lecture .pdf. **Estimated time to complete ~ 25 - 35 min**, but perhaps 2x that, if you rewind and review a lot, so max ~ 50 - 70 min.
3. **Complete Active Learning Q for each Lecture** on the day of each Lecture and submit that same night by way of Canvas by 11:59:59 pm (US Pacific Time). These 5 short questions are meant to make you think and to prompt you about what to be looking for in each lecture. If you have documented additional needs through our Accessible Education Center (AEC) *https://aec.uoregon.edu/using-aec-connect*, more time will be allotted for you to complete and submit the Active Learning Q for each Lecture. **Estimated time to complete = ~ 45 - 90 min** (most will be ~ 45 - 60 min), but depends upon AEC accommodations.
4. **Review the *.pdf* for each Lab**. **View and listen to each Lab *.mp4* and answer the Worksheet Q for each lab.** Most Worksheets have very few Q and are meant to get you to think about procedures and your own personal data. If you don't have access to personal data, I will provide you with phantom/sample data you can work on (listed under Lab Resources on Canvas). Worksheets are to be submitted the night of each Lab by way of Canvas by 11:59:59 pm US PDT. The Nutrition Lab is one exception due on the weekend because it requires a more detailed personal analysis and write-up.

If you have documented additional needs through our Accessible Education Center (AEC) *https://aec.uoregon.edu/using-aec-connect*, more time will be allotted for you to complete and submit the Worksheet for each Lab.
Estimated time to complete = ~ 45 - 90 min (most will be ~ 45 - 60 min), but depends upon AEC accommodations.

5. **Complete each of the 4 Quizzes.** Each Quiz will contain 20 Q (multi-modal, multiple choice...) and have a 30-min window to complete, sometime between 12 N and 11:59:59 pm US PDT on Fridays. If you have documented additional needs through our Accessible Education Center (AEC) *https://aec.uoregon.edu/using-aec-connect*, more time will be allotted for you to complete the quizzes. **Estimated time to complete ~ 20 - 30 min**, but depends upon AEC accommodations.

Quiz Directions: The quizzes are open book, but not open communication or conversation. You may use your textbook/s and lecture and lab notes, however, once you begin a quiz, you are not allowed to communicate with others, including classmates, family members or any humans (or telepathic animals!) by any communication means including by cell phone, texting, instant messaging, Zoom, e-mail or Morse code! You may not take pictures or use screen shots or snipping tools to capture quiz questions. You will check a box and provide your electronic signature as pledges ensuring that your work is yours alone independently, and that you have not engaged in any communication, conversation or any dishonesty, plagiarism, preconceived scams, copying or revealing of quiz questions. I want you to know that 1st and foremost, I was raised to value and respect the utmost of integrity and that I hold you to the highest of possible standards! Even though you can use your notes, text/s and Lab Manual, you should be able to answer questions without referring to these and the time allotment will not enable you to search and discover answers while you are taking a quiz. Once you start a quiz, you will have 30 minutes to complete it, unless you have received additional time for AEC accommodations. Best of luck!

Grading:
The grading for the course is as follows:
10% Lecture Attendance & Participation (determined by successfully completing and submitting the answers to all Active Learning Questions, attending online Lecture Discussions and viewing Lectures on Canvas)
10% Lab Attendance & Participation (determined by successfully completing and submitting the answers to all Lab Worksheets, attending Lab Discussions and viewing Labs on Canvas)
80% Quizzes (20% for each of the 4 Quizzes)

Organization: As mentioned previously, I would like to implement a reverse classroom plan, where you review each Lecture (*.pdf* & *.mp4*) online and attempt to complete Active Learning Questions on your own time, and then attend the Lecture-Discussion. Also, you review each Lab (*.pdf* & *.mp4*) and attempt to complete the Lab Worksheet for each lab at your leisure, then attend the Lab-Discussion. Your efforts outside of the Lecture and Lab Discussions will make you well-prepared and enable all of us to engage in each topic at a deeper level and more fully interact and learn together. Please let me know if you have any questions or need additional information or resources. I am looking forward to learning together and having fun this term! :)

University of Oregon
Department of Biology

Course: Introduction to Human Physiology, BI 121, 04 cr (CRN 11282), Remote, MW *Zoom* Lecture Discussions, 6:15 – 7:45 pm (US Pacific Daylight Time/PDT) and Lab Discussions R, either CRN 11283 (12:30 – 1:30 pm, US PDT) or CRN 11284 (2:00 – 3:00 pm, US PDT), Fall, 2020. *NB*: Optional attendance 6:15 – 7:45 pm, either night Monday, September 28 or Tuesday, September 29 Lecture 1 Discussion or on your own listen to *Lecture 1.mp4* and/or view *Lecture 1.pdf* so that you can answer Active Learning Questions. Also, note time shift from PDT to PST on Sunday, November 1st @ 2:00 am (fall backwards!). :)

Website: *https://canvas.uoregon.edu/courses/162585*

Lecturer; Office; Hours; Phone; E-Mail: V. Pat Lombardi; WEB; *Zoom* appointments by e-mail; 541-346-6055 (office/message); *lombardi@uoregon.edu*

Lab Instructors; Office; Hours; E-Mail: Carmen Ebel; WEB; *Zoom* appointments by e-mail; *cebel2@uoregon.edu*
Kelsey Schultz; WEB; *Zoom* appointments by e-mail; *kschult7@uoregon.edu*

Lab Preparator; E-Mail: Misty McLean-Schurbon, *mistym@uoregon.edu*

Required Texts: Sherwood, Lauralee (LS). *Fundamentals of Human Physiology, 4th ed.* Belmont, CA: Brooks/Cole, Cengage Learning, 2012, ISBN-13:0840062253. Digital rental or purchase, used or new textbook.

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1⁰ Supplemental Text: Readings listed in [ ] below:

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+See many supplemental reserved texts/resources in Science Library or web listing: *http://libweb.uoregon.edu/*
Click on the **Course Reserves** tab, then sign in with U of O ID and password & type in *BI 121*.

Tentative Outline:

Sep 28 (M) **Lecture 1 Discussion. Anatomy, Physiology & Homeostasis I.** I. Introduction (outline, text, grading, expectations…); Compare & Contrast Human Anatomy & Human Physiology; Body Levels of Organization. II. Homeostasis I. **Readings:** *ch 1 vignette p 0, ch 1 pp 1-10* (LS); *Introduction, Study Skills, pp iii-viii; Module 1, pp 1-8* (DC). **Assignment**: **Active Learning Questions Lecture 1.** Submit on Canvas by 11:59:59 pm, US PDT, by Wednesday, Sep 30th, 2020. [Optional attendance.]

OR

Sep 29 (T) **Lecture 1 Discussion. Anatomy, Physiology & Homeostasis I.** I. Introduction (outline, text, grading, expectations…); Compare & Contrast Human Anatomy & Human Physiology; Body Levels of Organization. II. Homeostasis I. **Readings:** *ch 1 vignette p 0, ch 1 pp 1-10* (LS); *Introduction, Study Skills, pp iii-viii; Module 1, pp 1-8* (DC). **Assignment**: **Active Learning Questions Lecture 1.** Submit on Canvas by 11:59:59 pm, US PDT, by Wednesday, Sep 30th, 2020. [Optional attendance.]

Sep 30 (W) **Lecture 2 Discussion. Homeostasis II, Cell Physiology.** I. Homeostasis II: – Negative *vs* + Positive Feedback; Simplified Homeostatic Model Balance Examples: Temperature & Blood Pressure. II. Cell Anatomy, Physiology & Compartmentalization: Size; Basic Survival Skills; Organelles. **Readings:** *ch 1, pp 11-17; ch 2, pp 18-27* (LS). **Assignment: Active Learning Questions Lecture 2.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 1 (R) **Lab 1 Discussion. Introduction to Anatomy & Physiology. Readings:** *pp 1-1 to 1-10* (LM). **Assignments: Introduction Card + Lab 1 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 5 (M) **Lecture 3 Discussion. Anaerobic *vs* Aerobic Metabolism.** I. Metabolism: Anaerobic (ATP-PC, Glycolytic) vs Aerobic; Subcategory Location & ATP Production. II. Cytoskeleton. **Readings:** *ch 2, pp 26-41* (LS). **Assignment: Active Learning Questions Lecture 3.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 7 (W) **Lecture 4 Discussion. Genetics: DNA, RNA & Proteins. Readings:** *Appendix B, pp A-16, A-17*; *Appendix C, pp A-18 to A-26* (LS). **Assignment: Active Learning Questions Lecture 4.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 8 (R) **Lab 2 Discussion. Histology: Microscopic Study of Tissues. Readings:** *pp i-iii, 1-1 to 1-4* (LM). **Activity:** Jeopardy Game 1. **Assignment: Lab 2 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 9 (F) **Quiz 1 on Canvas.** Covers Lectures 1 – 4 and Labs 1 & 2. Open 12 n until 11:59:59 pm, US PDT.

Oct 12 (M) **Lecture 5 Discussion. Nutrition & Disease Prevention.** I. Nutrition in the News. II. Standard Serving Sizes: Estimating for Dietary Analyses. III. Nutrients Essential for Life: Water, Energy Nutrients (1^0 Carbohydrates, 2^0 Fats, 3^0 Proteins), Vitamins & Minerals. IV. Blue Zones & Diets of the World's Longest-lived People. V. What about Paleo & Red Meat? VI. Exercise, Dieting or Both? VII. Nutrition Quackery. **Readings:** *ch 16 pp 485-6* (LS); *Module 2, pp 9-16* (DC); [*Highlights of ch 1, 2, pp 1-69*; *ch 9, pp 334-80 (S&W)*]; *See links on Outline p 1 under 1^0 Supplemental Text.* **Assignment: Active Learning Questions Lecture 5.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 14 (W) **Lecture 6 Discussion. Gastrointestinal System.** I. Hydrolysis, the Central Theme of Digestion. II. Gut Anatomy, Histology & General Secretions. III. Enzymatic Digestion, Absorption & Defecation. **Readings:** *ch 15, pp 436-445*; *focus on Table 15-1 pp 440-441* (LS). *Module 3, pp 17-23* (DC); [*ch 15, pp 445-459, 463-477* (LS)]. **Assignment: Active Learning Questions Lecture 6.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 15 (R) **Lab 3 Discussion. Nutrition Analyses.** Record your diet for at least one day on p 3-7 and analyze it using the *Diet Controller//Diet Organizer or ASA 24 National Cancer Institute Calorie Counter & Food Diary/Cronometer Nutrition Tracker, HealthyOut, My Fitness Pal or Other Smart Phone Software.* **Readings:** *pp 3-1 to 3-20* (LM). **Assignment: Lab 3 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT, by Saturday, October 17th, 2020.

Oct 19 (M) **Lecture 7 Discussion. Cardiovascular System.** I. Circulatory: Cardiovascular & Lymphatic. II. Cardiac Physiology: Anatomy, Adult Heart & Fetal Blood Flow. **Readings:** *ch 9, pp 228-234; ch 10, pp 281-7* (LS); *Module 4, pp 25-29; 33-34* (DC). **Assignment: Active Learning Questions Lecture 7.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 21 (W) **Lecture 8 Discussion. Atherosclerosis & Cardiovascular Diseases.** I. Atherosclerosis. II. Cardiovascular Diseases (CVDs): What's a Heart Attack (AMI)? Stroke (CVA)? Peripheral Vascular Disease (PVD)? Hypertension (HTN)? III. CVDs Risk Reduction: What Can I Do to Lower My Risk? IV. Heart Rate & Blood Pressure? **Readings:** *ch 9, pp 252-259; ch 10, pp 266-270, 287-295* (LS); *Module 4, pp 29-33* (DC). **Assignment: Active Learning Questions Lecture 8.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 22 (R) **Lab 4 Discussion. Heart Rate, Blood Pressure & Cardiovascular Disease Risk. Readings:** *pp 4-1 to 4-8* (LM). **Assignment: Lab 4 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 26 (M) **Activity in Lecture:** Jeopardy Game 2.

Oct 28 (W) Discussion & Review for Quiz 2.

Oct 29 (R) No Lab! Study for Quiz 2.

Oct 30 (F) **Quiz 2 on Canvas**. Covers Lectures 5 – 8 and Labs 3 & 4. Open 12 n until 11:59:59 pm, US PDT.

Nov 2 (M) **Lecture 9 Discussion. Blood.** I. Introduction to Blood Composition: Cells *vs* Liquid; Red Blood Cells, White Blood Cells, Platelets *vs* Plasma; Plasma *vs* Serum. II. White Blood Cell Differentiation & Function. **Readings:** *ch 11, pp 296-304* (LS). *Module 5, pp 35-9; highlights of Module 6, pp 41-9* (DC); *pp 5-1 thru 5-6* (LM). **Assignment: Active Learning Questions Lecture 9.** Submit on Canvas by 11:59:59 pm, US PST. *NB*: Switch from PDT to PST (fall backwards!).

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Introduction: *Human Physiology* is the study and *science of function in humans*– how processes work at cell, organ, tissue and body system levels of organization or as Lauralee Sherwood says, what makes us tick! It is a wonderfully broad and demanding field that encompasses many disciplines including anatomy, animal physiology, biochemistry, cell biology, environmental and exercise physiology, histology, immunology, mathematics, medical physiology, molecular biology, nutrition, pathophysiology (the study of diseases), physics, and systems physiology! The focus varies based on the adjective used in front of the word *physiology*. For example, the goal of *comparative* physiology is to contrast functions across the animal kingdom. Exercise physiology studies adaptations to unique modes of exercise, primarily in humans. Environmental physiology investigates specific adaptations due to environmental stressors like high vs. low altitudes and cold vs. hot climates. Viral physiology or virology examines mechanisms in viruses, infectious, microscopic, genetic material in a protein coat, found in almost all ecosystems on earth. Certainly, there is much overlap among subdisciplines. Though we will discuss examples from many areas of physiology, our primary focus will be to study humans under normal, healthy conditions at the body systems level. Topic coverage includes homeostasis, basic cell physiology and genetics, and physiology of the gut, heart, vessels, blood, glands, brain, nerves, muscles and lungs. Nutrition and exercise physiology are incorporated with goals of making the material more applicable to daily activities and to promote optimal choices to enhance body awareness and health for a lifetime! Whatever your plans, ultimately my hope is that you enhance your appreciation and understanding of the intricate and miraculous nature of the human body!

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◦ apply a simplified homeostatic model to the regulation of unique input variables that ensure that body systems maintain homeostasis leading to cell survival.
◦ explain the basic structure and function of cells and cell organelles.
◦ compare and contrast anaerobic and aerobic metabolism and assign specific exercises to unique areas of the energy continuum.
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◦ identify the common characteristics of the world's longest lived people in *Blue Zones*.
◦ analyze the nutrient content of your personal diet relative to national guidelines and make recommendations for self-improvement.
◦ articulate and debunk common myths about nutrition and exercise.
◦ summarize the basic structure and function of the gastrointestinal, cardiovascular, endocrine, nervous, skeletal muscular and respiratory systems.
◦ describe the physiology and inherent multi-organ risks of cigarette smoking and vaping.

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If you are on-campus taking the course, we have many resources on reserve in the Price Science Commons Library. Super nutrition resources with free links are listed below. Please contact me directly if you have questions about resources.

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https://www.hsph.harvard.edu/nutritionsource/
https://www.berkeleywellness.com/healthy-eating/nutrition
https://www.nutrition.gov/, *https://www.eatright.org*
https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics
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https://www.nhlbi.nih.gov/health/educational/wecan/tools-resources/nutrition.htm
https://health.gov/our-work/food-nutrition, *https://www.nutritionletter.tufts.edu/*

+If you have access to the U of O campus, see also many supplemental reserved texts and resources in the Price Science Commons Library or the web listing: *http://libweb.uoregon.edu/*. Click on the **Course Reserves** tab, then sign in with U of O ID and password & type in *BI 121.*

Lab: The Lab Manual contains all of the background and the worksheets for our 6 labs. It is usually for sale at the U of O Duckstore (Bookstore) for ~10 US dollars, but for this term, it is free because I am posting the Lab Worksheets and Lab Backgrounds for you online on Canvas.

Lombardi VP, Evonuk E & Carmack MA (LM). *BI 121, Introduction to Human Physiology, Laboratory Manual, Fall 2020.* Supplied free as Lab Worksheets & Lab Backgrounds on Canvas.

Requirements:
◦ **Review the Lecture *.pdfs*, *.mp4s* and Active Learning Questions prior to attending online Lecture Discussions.** So that we are able to engage fully in a reverse classroom configuration, it is crucial that you review at least *.pdfs* and question prompts prior to coming to our online lecture discussions. The answers to the Active Learning Questions are within the *.pdfs* and *.mp4s* and are not found in many cases by cruising the internet. Seek course material 1st prior to doing internet searches reflexively. I worked very hard to make the posted *.mp4* recordings 25-35 min, though our Lecture Discussions are scheduled for much longer.
◦ **Review the Lab *.pdfs*, *.mp4s* and Lab Background material and Lab Worksheets prior to attending online Lecture Discussions.** Again, so that we are able to take full advantage of a reverse classroom design, it is crucial that you review at least *.pdfs* and question prompts prior to coming to our online lab discussions. The answers to the lab worksheet questions are within the *.pdfs*, *.mp4s* and background material and cannot be found in many cases through internet searches. Seek course materials 1st prior to conducting internet searches reflexively. Our live labs most often taken 50 – 60 min, but I did everything I could to reduce this time as much as possible for the posted *.mp4* recordings.
◦ **Read, take notes and study** the pages listed from your textbooks (LS, Lauralee Sherwood and/or DC, Daniel Chiras) on your course outline prior to the Lecture-Discussions and the same for your Lab Manual (LM) prior to your Lab-Discussions. Again, this will help foster discussion and facilitate the reverse classroom framework.
◦ Complete **Active Learning Questions** and submit by way of Canvas by 11:59:59 pm the night of the Lecture-Discussions.
◦ Complete **Lab Worksheets** and submit by way of Canvas by 11:59:59 pm the night of lab-discussions. The Nutrition Lab is one exception, as you have until the weekend to submit.
◦ Complete four online **Canvas Quizzes** covering all Active Learning Q and Lectures and Worksheets and Labs for the specific modules covered (see Course Outline for details).

Details:
Lecture and Lab Discussions are scheduled throughout the week and it is critical that you attend and participate. I will do my best to accommodate you given your unique schedules, work and other duties, and to help you out with any questions you might have. I know that several of you are in China and Europe and throughout the US, so in quite different time zones *https://www.timeanddate.com/worldclock/*! [The way I try to remember is Eugene + 8 hr = London and London + 8 hr = Tokyo! So Eugene + 16 hr = Tokyo!] Thus, if you need more help, I will be able to accommodate most of you in Europe, but will have to do extra odd times to help those in Japan and China and other parts of the world. Again, I will do my best.

All Active Learning Q, Lectures, Lab Worksheets and Labs will be posted by the preceding Friday on Canvas for the following week. All Active Learning Q for Lectures and Lab Worksheets for the Labs are to be submitted by way of Canvas. All Quizzes will be taken on Canvas and grades tabulated and available on Canvas.

You must do your best to focus and to keep up consistently with the work! Remember, the benefits you gain will be directly proportional to the efforts you invest!

Here is a quick review of requirements along with estimated time for completion:

1. **Review each Lecture *.pdf* and review the embedded links** so that you glean unique perspectives from articles, videos and other resources to help with your understanding. **Estimated time to complete = ~ 25 - 35 min.**
2. **Actively view and listen to each Lecture *.mp4* with video and audio.** These have been compressed to 25-35 min from the normal lecture time of more than double this! Be focused and looking for answers to the Active Learning Q that you may have not picked up through your reading and by reviewing the Lecture .pdf. **Estimated time to complete ~ 25 - 35 min**, but perhaps 2x that, if you rewind and review a lot, so max ~ 50 - 70 min.
3. **Complete Active Learning Q for each Lecture** on the day of each Lecture and submit that same night by way of Canvas by 11:59:59 pm (US Pacific Time). These 5 short questions are meant to make you think and to prompt you about what to be looking for in each lecture. If you have documented additional needs through our Accessible Education Center (AEC) *https://aec.uoregon.edu/using-aec-connect*, more time will be allotted for you to complete and submit the Active Learning Q for each Lecture. **Estimated time to complete = ~ 45 - 90 min** (most will be ~ 45 - 60 min), but depends upon AEC accommodations.
4. **Review the *.pdf* for each Lab**. **View and listen to each Lab *.mp4* and answer the Worksheet Q for each lab.** Most Worksheets have very few Q and are meant to get you to think about procedures and your own personal data. If you don't have access to personal data, I will provide you with phantom/sample data you can work on (listed under Lab Resources on Canvas). Worksheets are to be submitted the night of each Lab by way of Canvas by 11:59:59 pm US PDT. The Nutrition Lab is one exception due on the weekend because it requires a more detailed personal analysis and write-up.

If you have documented additional needs through our Accessible Education Center (AEC) *https://aec.uoregon.edu/using-aec-connect*, more time will be allotted for you to complete and submit the Worksheet for each Lab.
Estimated time to complete = ~ 45 - 90 min (most will be ~ 45 - 60 min), but depends upon AEC accommodations.

5. **Complete each of the 4 Quizzes.** Each Quiz will contain 20 Q (multi-modal, multiple choice...) and have a 30-min window to complete, sometime between 12 N and 11:59:59 pm US PDT on Fridays. If you have documented additional needs through our Accessible Education Center (AEC) *https://aec.uoregon.edu/using-aec-connect*, more time will be allotted for you to complete the quizzes. **Estimated time to complete ~ 20 - 30 min**, but depends upon AEC accommodations.

Quiz Directions: The quizzes are open book, but not open communication or conversation. You may use your textbook/s and lecture and lab notes, however, once you begin a quiz, you are not allowed to communicate with others, including classmates, family members or any humans (or telepathic animals!) by any communication means including by cell phone, texting, instant messaging, Zoom, e-mail or Morse code! You may not take pictures or use screen shots or snipping tools to capture quiz questions. You will check a box and provide your electronic signature as pledges ensuring that your work is yours alone independently, and that you have not engaged in any communication, conversation or any dishonesty, plagiarism, preconceived scams, copying or revealing of quiz questions. I want you to know that 1st and foremost, I was raised to value and respect the utmost of integrity and that I hold you to the highest of possible standards! Even though you can use your notes, text/s and Lab Manual, you should be able to answer questions without referring to these and the time allotment will not enable you to search and discover answers while you are taking a quiz. Once you start a quiz, you will have 30 minutes to complete it, unless you have received additional time for AEC accommodations. Best of luck!

Grading:
The grading for the course is as follows:
10% Lecture Attendance & Participation (determined by successfully completing and submitting the answers to all Active Learning Questions, attending online Lecture Discussions and viewing Lectures on Canvas)
10% Lab Attendance & Participation (determined by successfully completing and submitting the answers to all Lab Worksheets, attending Lab Discussions and viewing Labs on Canvas)
80% Quizzes (20% for each of the 4 Quizzes)

Organization: As mentioned previously, I would like to implement a reverse classroom plan, where you review each Lecture (*.pdf* & *.mp4*) online and attempt to complete Active Learning Questions on your own time, and then attend the Lecture-Discussion. Also, you review each Lab (*.pdf* & *.mp4*) and attempt to complete the Lab Worksheet for each lab at your leisure, then attend the Lab-Discussion. Your efforts outside of the Lecture and Lab Discussions will make you well-prepared and enable all of us to engage in each topic at a deeper level and more fully interact and learn together. Please let me know if you have any questions or need additional information or resources. I am looking forward to learning together and having fun this term! :)

University of Oregon
Department of Biology

Course: Introduction to Human Physiology, BI 121, 04 cr (CRN 17844), Remote, TR *Zoom* Lecture Discussions, 10:15 – 11:45 am (US Pacific Daylight Time/PDT) and Lab Discussions R, either CRN 11285 (3:30 – 4:30 pm, US PDT) or CRN 11286 (5:00 – 6:00 pm, US PDT), Fall, 2020. *NB*: Time shift from PDT to PST on Sunday, November 1st @ 2:00 am (fall backwards!). :)

Website: *https://canvas.uoregon.edu/courses/167695*

Lecturer; Office; Hours; Phone; E-Mail: V. Pat Lombardi; WEB; *Zoom* appointments by e-mail; 541-346-6055 (office/message); *lombardi@uoregon.edu*

Lab Instructors; Office; Hours; E-Mail: Kelsey Schultz; WEB; *Zoom* appointments by e-mail; *kschult7@uoregon.edu*
Carmen Ebel; WEB; *Zoom* appointments by e-mail; *cebel2@uoregon.edu*

Lab Preparator; E-Mail: Misty McLean-Schurbon, *mistym@uoregon.edu*

Required Texts: Sherwood, Lauralee (LS). *Fundamentals of Human Physiology, 4th ed.* Belmont, CA: Brooks/Cole, Cengage Learning, 2012, ISBN-13:0840062253. Digital rental or purchase, used or new textbook.

OR

Chiras, Daniel D. (DC). *Human Body Systems: Structure, Function and Environment, 2nd ed.* Burlington, MA: Jones and Bartlett Learning, 2013. Digital rental or purchase, used or new textbook.

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Lombardi VP, Evonuk E & Carmack MA (LM). *BI 121, Introduction to Human Physiology, Laboratory Manual, Fall 2020*. Supplied free as Lab Worksheets & Lab Backgrounds on Canvas.

1^0 Supplemental Text: Readings listed in [ ] below:

Sizer, Frances S. & Whitney, Eleanor N. (S&W). *Nutrition: Concepts & Controversies, 15th, 14th, 13th or 12th ed.* Boston, MA: Cengage Learning, 2020, 2017, 2013 or 2010 or other peer-reviewed nutrition textbook. See also:

https://nutritionfacts.org/, *https://www.cspinet.org/eating-healthy*, *https://www.hsph.harvard.edu/nutritionsource/*, *https://www.berkeleywellness.com/healthy-eating/nutrition*, *https://www.nutrition.gov/*, *https://www.eatright.org*, *https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics*, *https://www.aicr.org/cancer-prevention/*, *https://mynutrition.wsu.edu/nutrition-basics*, *https://www.nhlbi.nih.gov/health/educational/wecan/tools-resources/nutrition.htm*, *https://health.gov/our-work/food-nutrition*, *https://www.nutritionletter.tufts.edu/*
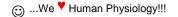
+See many supplemental reserved texts/resources in Science Library or web listing: *http://libweb.uoregon.edu/* Click on the ***Course Reserves*** tab, then sign in with U of O ID and password & type in *BI 121*.

Tentative Outline:

Sep 29 (T) **Lecture 1 Discussion. Anatomy, Physiology & Homeostasis I.** I. Introduction (outline, text, grading, expectations…); Compare & Contrast Human Anatomy & Human Physiology; Body Levels of Organization. II. Homeostasis I. **Readings:** *ch 1 vignette p 0, ch 1 pp 1-10* (LS); *Introduction, Study Skills, pp iii-viii; Module 1, pp 1-8* (DC). **Assignment**: **Active Learning Questions Lecture 1.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 1 (R) **Lecture 2 Discussion. Homeostasis II, Cell Physiology.** I. Homeostasis II: – Negative *vs* + Positive Feedback; Simplified Homeostatic Model Balance Examples: Temperature & Blood Pressure. II. Cell Anatomy, Physiology & Compartmentalization: Size; Basic Survival Skills; Organelles. **Readings:** *ch 1, pp 11-17; ch 2, pp 18-27* (LS). **Assignment: Active Learning Questions Lecture 2.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 1 (R) **Lab 1 Discussion. Introduction to Anatomy & Physiology. Readings:** *pp 1-1 to 1-10* (LM). **Assignments: Introduction Card + Lab 1 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 6 (T) **Lecture 3 Discussion. Anaerobic *vs* Aerobic Metabolism.** I. Metabolism: Anaerobic (ATP-PC, Glycolytic) vs Aerobic; Subcategory Location & ATP Production. II. Cytoskeleton. **Readings:** *ch 2, pp 26-41* (LS). **Assignment: Active Learning Questions Lecture 3.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 8 (R) **Lecture 4 Discussion. Genetics: DNA, RNA & Proteins. Readings:** *Appendix B, pp A-16, A-17;* *Appendix C, pp A-18 to A-26* (LS). **Assignment: Active Learning Questions Lecture 4.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 8 (R) **Lab 2 Discussion. Histology: Microscopic Study of Tissues. Readings:** *pp i-iii, 1-1 to 1-4* (LM). **Activity:** Jeopardy Game 1. **Assignment: Lab 2 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 9 (F) **Quiz 1 on Canvas.** Covers Lectures 1 – 4 and Labs 1 & 2. Open 12 n until 11:59:59 pm, US PDT.

Oct 13 (T) **Lecture 5 Discussion. Nutrition & Disease Prevention.** I. Nutrition in the News. II. Standard Serving Sizes: Estimating for Dietary Analyses. III. Nutrients Essential for Life: Water, Energy Nutrients (1^0 Carbohydrates, 2^0 Fats, 3^0 Proteins), Vitamins & Minerals. IV. Blue Zones & Diets of the World's Longest-lived People. V. What about Paleo & Red Meat? VI. Exercise, Dieting or Both? VII. Nutrition Quackery. **Readings:** *ch 16 pp 485-6* (LS); *Module 2, pp 9-16* (DC); [*Highlights of ch 1, 2, pp 1-69; ch 9, pp 334-80 (S&W)*]; *See links on Outline p 1 under 1^0 Supplemental Text.* **Assignment: Active Learning Questions Lecture 5.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 15 (R) **Lecture 6 Discussion. Gastrointestinal System.** I. Hydrolysis, the Central Theme of Digestion. II. Gut Anatomy, Histology & General Secretions. III. Enzymatic Digestion, Absorption & Defecation. **Readings:** *ch 15, pp 436-445; focus on Table 15-1 pp 440-441* (LS). *Module 3, pp 17-23* (DC); [*ch 15, pp 445-459, 463-477* (LS)]. **Assignment: Active Learning Questions Lecture 6.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 15 (R) **Lab 3 Discussion. Nutrition Analyses.** Record your diet for at least one day on p 3-7 and analyze it using the *Diet Controller//Diet Organizer or ASA 24 National Cancer Institute Calorie Counter & Food Diary/Cronometer Nutrition Tracker, HealthyOut, My Fitness Pal or Other Smart Phone Software.* **Readings:** *pp 3-1 to 3-20* (LM). **Assignment: Lab 3 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT, by Saturday, October 17th, 2020.

Oct 20 (T) **Lecture 7 Discussion. Cardiovascular System.** I. Circulatory: Cardiovascular & Lymphatic. II. Cardiac Physiology: Anatomy, Adult Heart & Fetal Blood Flow. **Readings:** *ch 9, pp 228-234; ch 10, pp 281-7* (LS); *Module 4, pp 25-29; 33-34* (DC). **Assignment: Active Learning Questions Lecture 7.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 22 (R) **Lecture 8 Discussion. Atherosclerosis & Cardiovascular Diseases.** I. Atherosclerosis. II. Cardiovascular Diseases (CVDs): What's a Heart Attack (AMI)? Stroke (CVA)? Peripheral Vascular Disease (PVD)? Hypertension (HTN)? III. CVDs Risk Reduction: What Can I Do to Lower My Risk? IV. Heart Rate & Blood Pressure? **Readings:** *ch 9, pp 252-259; ch 10, pp 266-270, 287-295* (LS); *Module 4, pp 29-33* (DC). **Assignment: Active Learning Questions Lecture 8.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 22 (R) **Lab 4 Discussion. Heart Rate, Blood Pressure & Cardiovascular Disease Risk. Readings:** *pp 4-1 to 4-8* (LM). **Assignment: Lab 4 Worksheet.** Submit on Canvas by 11:59:59 pm, US PDT.

Oct 27 (T) **Activity in Lecture:** Jeopardy Game 2.

Oct 29 (R) Discussion & Review for Quiz 2.

Oct 29 (R) No Lab! Study for Quiz 2.

Oct 30 (F) **Quiz 2 on Canvas**. Covers Lectures 5 – 8 and Labs 3 & 4. Open 12 n until 11:59:59 pm, US PDT.

Nov 3 (T) **Lecture 9 Discussion. Blood.** I. Introduction to Blood Composition: Cells *vs* Liquid; Red Blood Cells, White Blood Cells, Platelets *vs* Plasma; Plasma *vs* Serum. II. White Blood Cell Differentiation & Function. **Readings:** *ch 11, pp 296-304* (LS). *Module 5, pp 35-9; highlights of Module 6, pp 41-9* (DC); *pp 5-1 thru 5-6* (LM). **Assignment: Active Learning Questions Lecture 9.** Submit on Canvas by 11:59:59 pm, US PST. *NB*: Switch from PDT to PST (fall backwards!).

Nov 5 (R)   **Lecture 10 Discussion. Blood Testing.** I. Blood Chemistry Review. II. Hematocrit & Blood Typing. III. Blood Glucose. IV. Diabetes Mellitus: Type I *vs* Type II; How Exercise & Diet Impact. **Readings**: *ch 17, pp 525-536* (LS); *Module 13, pp 110-12* (DC). **Assignment: Active Learning Questions Lecture 10.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 5 (R)   **Lab 5 Discussion. Blood Chemistry: Blood Glucose & Blood Typing. Readings:** *pp 5-1 to 5-6* (LM). **Assignment: Lab 5 Worksheet.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 10 (T)   **Lecture 11 Discussion. Endocrine System.** I. Introduction to the Endocrine System: What's an Endocrine? Classifying Hormones. IV. Hypothalamus, Pituitary & Target Organs. **Readings:** *ch 4, pp 94-105*; *ch 17, pp 494-525* (LS); *Module 13, pp 103-113* (DC). **Assignment: Active Learning Questions Lecture 11.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 12 (R)   **Lecture 12 Discussion. Nervous System.** I. Nervous System & Neurons (Nerve Cells); Central (Brain & Spinal Cord) vs. Peripheral Nervous System (Afferent & Efferent Divisions); II. The Autonomic Nervous System; Fight or Flight. III. Action Potentials, Synapses & the Neuromuscular Junction. **Readings:** *ch 5, pp 106-120*; *ch 7, pp 178-193*; *highlights of ch 4, pp 70-88* (LS); *Module 9, pp 67-77* (DC). **Assignment: Active Learning Questions Lecture 12.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 12 (R)   **Activity in Lab:** Jeopardy Game 3 + Discussion & Review for Quiz 3.

Nov 13 (F)   **Quiz 3 on Canvas**. Covers Lectures 9 – 12 and Lab 5. Open 12 n until 11:59:59 pm, US PST.

Nov 17 (T)   **Lecture 13 Discussion. Skeletal Muscle Structure & Function.** I. Major Muscle Types; Structure of Skeletal Muscle. II. Molecular Basis of Skeletal Muscle Contraction. III. Metabolism & Fiber Types, Skeletal Muscle Adaptations. **Readings:** *ch 8, pp 194-204, 210-14* (LS); *Module 12, pp 97-102* (DC). **Assignment: Active Learning Questions Lecture 13.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 19 (R)   **Lecture 14 Discussion. Respiratory System.** I. Respiratory System: Structure & Histology. II. Gas Volumes & Capacities, III. Ventilation Mechanics & Control. IV. Gas Exchange & Transport. **Readings:** *ch 12, highlights of pp 344-379* (LS); *Module 7, pp 51-57* (DC). **Assignment: Active Learning Questions Lecture 14.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 19 (R)   **Lab 6 Discussion: Pulmonary Function Tests. Readings:** *pp 6-1 to 6-8* (LM). **Assignment: Lab 6 Worksheet.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 24 (T)   **Lecture 15 Discussion. Cigarette Smoking & Vaping. Readings & Videos:** *https://www.lung.org/quit-smoking/smoking-facts/health-effects*, *https://www.cancer.org/cancer/cancer-causes/tobacco-and-cancer.html*, *https://smokefree.gov/quit-smoking/why-you-should-quit/health-effects*, *https://www.cdc.gov/tobacco/campaign/tips/quit-smoking/index.html*, *https://www.pbs.org/video/vaping-1576094392/*; *ch 11, p 340* (LS); *Module 7, p 57* (DC). **Assignment: Active Learning Questions Lecture 15.** Submit on Canvas by 11:59:59 pm, US PST, by Wednesday, November 25th, 2020.

Nov 26 (R)   No Lecture or Lab. Happy Thanksgiving! :)

Dec 1 (T)   **Activity in Lecture:** Jeopardy Game 4.

Dec 3 (R)   Discussion & Review for Quiz 4.

Dec 3 (R)   No Lab. Study for Quiz 4.

Dec 4 (F)   **Quiz 4 on Canvas**. Covers Lectures 13 – 15 and Lab 6. Open 12 n until 11:59:59 pm, US PST.

    Grading: 10% Lecture Attendance & Active Learning Questions submitted on Canvas
                10% Lab Attendance & Worksheets submitted on Canvas
                80% 4 Weekly Quizzes on Canvas each worth 20%

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Nov 4 (W)   **Lecture 10 Discussion. Blood Testing.** I. Blood Chemistry Review. II. Hematocrit & Blood Typing. III. Blood Glucose. IV. Diabetes Mellitus: Type I *vs* Type II; How Exercise & Diet Impact. **Readings**: *ch 17, pp 525-536* (LS); *Module 13, pp 110-12* (DC). **Assignment: Active Learning Questions Lecture 10.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 5 (R)   **Lab 5 Discussion. Blood Chemistry: Blood Glucose & Blood Typing. Readings:** *pp 5-1 to 5-6* (LM). **Assignment: Lab 5 Worksheet.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 9 (M)   **Lecture 11 Discussion. Endocrine System.** I. Introduction to the Endocrine System: What's an Endocrine? Classifying Hormones. IV. Hypothalamus, Pituitary & Target Organs. **Readings:** *ch 4, pp 94-105*; *ch 17, pp 494-525* (LS); *Module 13, pp 103-113* (DC). **Assignment: Active Learning Questions Lecture 11.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 11 (W)   **Lecture 12 Discussion. Nervous System.** I. Nervous System & Neurons (Nerve Cells); Central (Brain & Spinal Cord) vs. Peripheral Nervous System (Afferent & Efferent Divisions); II. The Autonomic Nervous System; Fight or Flight. III. Action Potentials, Synapses & the Neuromuscular Junction. **Readings:** *ch 5, pp 106-120*; *ch 7, pp 178-193*; *highlights of ch 4, pp 70-88* (LS); *Module 9, pp 67-77* (DC). **Assignment**: **Active Learning Questions Lecture 12.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 12 (R)   **Activity in Lab:** Jeopardy Game 3 + Discussion & Review for Quiz 3.

Nov 13 (F)   **Quiz 3 on Canvas**. Covers Lectures 9 – 12 and Lab 5. Open 12 n until 11:59:59 pm, US PST.

Nov 16 (M)   **Lecture 13 Discussion. Skeletal Muscle Structure & Function.** I. Major Muscle Types; Structure of Skeletal Muscle. II. Molecular Basis of Skeletal Muscle Contraction. III. Metabolism & Fiber Types, Skeletal Muscle Adaptations. **Readings:** *ch 8, pp 194-204, 210-14* (LS); *Module 12, pp 97-102* (DC). **Assignment**: **Active Learning Questions Lecture 13.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 18 (W)   **Lecture 14 Discussion. Respiratory System.** I. Respiratory System: Structure & Histology. II. Gas Volumes & Capacities, III. Ventilation Mechanics & Control. IV. Gas Exchange & Transport. **Readings:** *ch 12, highlights of pp 344-379* (LS); *Module 7, pp 51-57* (DC). **Assignment: Active Learning Questions Lecture 14.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 19 (R)   **Lab 6 Discussion: Pulmonary Function Tests. Readings:** *pp 6-1 to 6-8* (LM) (WEB). **Assignment: Lab 6 Worksheet.** Submit on Canvas by 11:59:59 pm, US PST.

Nov 23 (M)   **Lecture 15 Discussion. Cigarette Smoking & Vaping. Readings & Videos:** *https://www.lung.org/quit-smoking/smoking-facts/health-effects*, *https://www.cancer.org/cancer/cancer-causes/tobacco-and-cancer.html*, *https://smokefree.gov/quit-smoking/why-you-should-quit/health-effects*, *https://www.cdc.gov/tobacco/campaign/tips/quit-smoking/index.html*, *https://www.pbs.org/video/vaping-1576094392/*; *ch 11, p 340* (LS); *Module 7, p 57* (DC). **Assignment: Active Learning Questions Lecture 15.** Submit on Canvas by 11:59:59 pm, US PST, by Wednesday, November 25th, 2020.

Nov 25 (W)   No Lecture. Happy Thanksgiving! :)

Nov 26 (R)   No Lab. Happy Thanksgiving! :)

Nov 30 (M)   **Activity in Lecture:** Jeopardy Game 4.

Dec 2 (W)   Discussion & Review for Quiz 4.

Dec 3 (R)   No Lab. Study for Quiz 4.

Dec 4 (F)   **Quiz 4 on Canvas**. Covers Lectures 13 – 15 and Lab 6. Open 12 n until 11:59:59 pm, US PST.

Grading: 10% Lecture Discussions & Active Learning Questions submitted on Canvas
10% Lab Discussions & Worksheets submitted on Canvas
80% 4 Weekly Quizzes on Canvas each worth 20%

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