



Your competence will be assessed as you complete the AOT1 performance assessment for this course of study. This course of study may take up to 6 weeks to complete.

Introduction

Overview

Welcome to the Anatomy and Physiology Course of Study! As a result of completing this course of study, you will come to know your body much better. This knowledge will benefit you, not only personally but professionally, in your nursing career where your primary focus will be on caring for patients.

The Anatomy and Physiology Course of Study covers the topics of metabolism, homeostasis, fluid balance, oxygenation, and mobility. These aspects underlie the functions of the major organ systems and the dysfunctions that can lead to major problems in the vital organs. These topics provide a basis for understanding the whole human system and the fundamental skills needed in your nursing program.

Outcomes and Evaluation

There are 5 competencies covered by this course of study; they are listed in the ["Competencies for Human Physiology \(AOT1\)"](#) page.

You will complete the following assessments as you work through the course of study.

Performance Assessment

You will complete the following tasks in [TaskStream](#) as part of the AOT1 performance assessment:

- AOT1: Task 211.3.1-01-05
- AOT1: Task 211.3.2-01-06
- AOT1: Task 211.3.3-01-5
- AOT1: Task 211.3.4-01-14
- AOT1: Task 211.3.5-01-06

Click on the link located in the "Assessment Preparation" box in the upper left-hand side of your screen to preview expectations for each task. Task instructions and evaluation rubrics are available by clicking the title of the course of study in the navigation options.

For directions on how to receive access to performance assessments, see the ["Accessing Performance Assessments"](#) page.

For help on using TaskStream for submitting your performance assessments, please watch the following video in the WGU Channel:

- [Using TaskStream](#)



Nursing Dispositions Statement

Please review the [Statement of Nursing Dispositions](#).

Preparing for Success

The information in this section is provided to help you become ready to complete this course of study. As you proceed, you will need to be organized in your studies in order to gain competency in the indicated areas and prepare yourself to pass the final assessments.

Your Learning Resources

The learning resources listed in this section will be required to complete the activities in this course of study. Follow the instructions provided to access these resources as early as possible in order to give yourself time to become familiar with them.

Enroll in Learning Resources

You will need to enroll in or subscribe to learning resources as a part of this course of study. You may already have enrolled in these resources for other courses. Please check the "Learning Resources" tab and verify that you have access to the following learning resources. If you do not currently have access, please enroll or renew your enrollment at this time. Note: For instructions on how to enroll in or subscribe to learning resources through the "Learning Resources" tab, please see the "[Acquiring Your Learning Resources](#)" page.

Pearson Anatomy and Physiology

The Pearson Anatomy and Physiology resource is integral to this course of study.

The following e-text is available through Pearson Anatomy and Physiology:

- Marieb, E. N., (2009). Essentials of human anatomy & physiology (9th ed.). Benjamin Cummings. ISBN-10:0321513428, ISBN-13: 978-0321513427.

Note: The WGU Bookstore has this book available for immediate purchase and delivery. To purchase this from the WGU Bookstore, use the "Buy Now" link on the "Learning Resources" tab. You may shop at other online bookstores, but be sure to order early and use the ISBN listed to ensure that you receive the correct edition.

TaskStream

At the end of each subject in this course of study, you will need to complete and submit performance assessments into [TaskStream](#) to demonstrate your competence. In order to obtain the instructions for each task and to submit your work, you will need to be enrolled in [TaskStream](#).

Additional information on [TaskStream](#) can be found on the Student Portal in the "Resources" tab at the bottom of the page, or use the "[TaskStream Help](#)". Contact your mentor to go over these [TaskStream](#) processes and requirements.

Purchase Learning Resources

Listed below are the learning resource materials you will need to obtain.



PowerPhys

The PowerPhys CD-ROM is a required component of this course of study and is used in the performance tasks:

- Allen, C., Harper, V., Lancraft, T., & Ivlev, Y. (2007). *PowerPhys* (Version 1.0) [Computer software]. Wiley. ISBN-10: 0471662891, ISBN-13: 978-0471662891.

Note: The WGU Bookstore has this software available for immediate purchase and delivery. You may shop at other online bookstores, but be sure to order early and use the correct ISBN to get the correct version.

Additional Preparation

There are many different learning tools available to you within your course of study in addition to the learning resources already discussed. Take the time to familiarize yourself with them and determine how best to fit them into your learning process.

Message Boards, FAQs, Note-Taking Tool

Message boards, FAQs, and a note-taking tool are available in every course of study.

Use the “[Additional Learning Tools](#)” page to review these tools.

The WGU Central Library

The [WGU Central Library](#) is available online to WGU students 24 hours a day. The library offers access to a number of resources, including over 60,000 full-text e-books; articles from journals, magazines, and newspapers; course e-reserves; and tutorials on how to use these resources and the library. The library also includes a reference service for help with research questions or navigating the library.

For more information about using the WGU Library, view the “WGU Library: Finding Articles, Books & E-Reserves” video in the Student Resources section of [The WGU Channel](#).

Center for Writing Excellence: The WGU Writing Center

If you need help with any part of the writing or revision process, contact the Center for Writing Excellence (CWE). Whatever your needs—writing anxiety, grammar, general college writing concerns, or even ESL language-related writing issues—the CWE is available to help you. The CWE offers personalized individual sessions and weekly group webinars. For an appointment, please e-mail writingcenter@wgu.edu.

Course Instructor Assistance

Course instructors are available to help you. Their job is to aid understanding in areas where you need to improve and to guide you to learning resources. Request their help as needed when preparing for assessments.

Course instructors cannot provide reviews of entire assessments. If you fail assessment attempts, review the provided feedback first, then ask the course instructor specific questions



about what you can do to meet the competency standard. Request course instructor assistance as necessary in preparing for second attempts at objective assessments or performance task revisions. Mentors cannot guarantee you pass as they do not evaluate assessments; however, they can provide the assistance and advice necessary to help you succeed.

Metabolism and Homeostasis

Metabolism is a continual process of coordinated chemical reactions that build molecules and cells, store energy for future use (anabolism), and break down larger molecules to produce needed energy (catabolism). The goal of this ongoing process is to achieve and maintain what is known as homeostasis—a state of balance within the body's inner environment. It is essential that you understand the physiology of metabolism and homeostasis in order to conceptualize the pathophysiology.

The activities associated with this subject will introduce you to glucose metabolism and glucose regulation in exercise. This section will focus on catabolic and anabolic metabolism, with special emphasis on diabetes. Diabetes is on the rise, especially in the pediatric population; thus, it is important that healthcare professionals be well versed in the physiology of metabolism and homeostasis.

Glucose Metabolism

Glucose metabolism is an important process in the body. It is one that humans cannot live without. When the process of glucose metabolism does not work properly, it can result in dire consequences.

Initial Concept Map: Glucose Metabolism

Think about what you already know about glucose metabolism or blood sugar. What terms about glucose metabolism do you already know? Make a concept map to show terms you know, what systems of the body are involved, and what processes and interactions occur.

Endocrine System Functions

Access the following in *Essentials of Human Anatomy and Physiology* learning resource:

- chapter 9 ("The Endocrine System and Hormone Function")

First look over and try to answer the self-assessment questions offered under the arrow pointing to "DID YOU GET IT?" If you are unable to answer a question, go to the *Essentials of Human Anatomy and Physiology* text and review [chapter 9 \("The Endocrine System"\)](#).

Click on the "Summary" section and read the summary of the above section. Continue on to the end-of-chapter questions and answer questions 2, 10, 12, and 14. Review material whenever you are unable to answer a question with confidence.

Go to the in the Anatomy and Physiology Part II Message Board and post a message with pertinent insights you have found.

Teaching About Glucose Metabolism



Explain glucose metabolism in your own words to a family member or peer.



Connecting New Knowledge of Blood Glucose Regulation

Given your new knowledge of blood glucose regulation, answer the following questions:

- Can you explain why people are often not hungry after a full night of sleep, even though they have not eaten for ten or eleven hours?
- Can you explain why a person who has eaten a high-carbohydrate snack often feels very hunger after one or two hours?

Modifying Concept Map: Glucose Metabolism

Now go back to your initial concept map. Add to or modify it based on what you have learned. What questions do you still have?

Exercise in Blood Glucose Regulation

Go to [TaskStream](#) and complete task 211.3.1-01-05.

Note: Once you begin the laboratory report in PowerPhys, you cannot return to the information or data-collection sections, or you will lose your data and answers in the report. Save your completed report as a PDF, review the rubric for the task, and submit it in TaskStream.

Homeostasis

Homeostasis describes a balance within the body. This might involve an acid-base balance or a balance in enzymes, minerals, temperature, etc. In order for the body to work effectively and efficiently, it needs to be in homeostasis. Normally the body will seek this state. However, under stress or sickness homeostasis may not occur.

Initial Concept Map: Homeostasis

Make a concept map to show everything you know about homeostasis. You will add to it as you complete this section.

Homeostasis and the Digestive System

Access the following in the *Essentials of Human Anatomy and Physiology* learning resource:

- chapter 14 ("Functions of the Digestive System and Metabolism")

Answer the self-assessment questions offered under the arrow pointing to "DID YOU GET IT?" If you are unable to answer a question, read *Essentials of Human Anatomy and Physiology* [chapter 14 \("The Digestive System and Body Metabolism"\)](#).

Click on the chapter summary and read the summary of the above section. Continue on to the end-of-chapter questions and answer questions 10, 11, 13, 24, 25, 32, 33, 35, and 37. Review material whenever you are unable to answer a question with confidence.

Go to the Anatomy and Physiology Part II Message Board and discuss pertinent insights with your peers.

Enzyme Sucrase



Given your new knowledge related to the enzyme sucrase, think about a person with an inadequate supply of sucrase.

Read the "[Congenital Sucrase-Isomaltase Deficiency](#)" web page.

Do you think a person could survive if they lacked the sucrase enzyme entirely? Write down your thoughts in your notes.

Modify Concept Map: Homeostasis

Return to your initial concept map. Now that you have completed this module, can you add to the concept map? Can you explain the action of enzymes in promoting homeostasis?

Enzyme Activity

Go to [TaskStream](#) and complete task 211.3.2-01-06.

Note: Once you begin the laboratory report in PowerPhys, you cannot return to the information or data-collection sections, or you will lose your data and answers in the report. Save your completed report as a PDF, review the rubric for the task, and submit it in TaskStream.

Fluid Balance

Did you ever go on a long run or fast walk when it was hot and humid? What happened to your body? Usually, people will experience losing a lot of fluid through sweating. By the end of the run or walk, you might feel weak. This is the result of an imbalance in fluid and possibly oxygen.

Two excellent examples of the body's ability to maintain homeostasis are in the areas of fluid balance and oxygenation. The relationship between blood plasma and urine osmolarity differs depending on a person's state of hydration. In addition, the anti-diuretic hormone (ADH) influences normal daily urine production. The goal of the respiratory system is to meet the oxygen demands of every cell in the body and maintain oxygenation homeostasis. The activities associated with this subject will introduce you to concepts related to hydration, fluid balance, and oxygenation.

Fluid Balance

Mountain climbers often face acute mountain sickness (AMS), which results from a lack of oxygen to the brain. Fluid balance goes hand in hand with oxygenation, as low circulation of fluid caused by dehydration can reduce oxygen flow to various parts of the body.

Initial Concept Map: Fluid Balance

Make a concept map on everything you know or think you know about fluid balance and imbalance. Think about what happens when there is imbalance. Make as many connections between body systems and processes as possible.

Fluid, Electrolyte, and Acid-Base Balance

Access the following in the *Essentials of Human Anatomy and Physiology* learning resource:

- chapter 15 ("Fluid, Electrolyte, and Acid-Base Balance")



Answer the self-assessment questions offered under the arrow pointing to "DID YOU GET IT?" If you are unable to answer a question, review *Essentials of Human Anatomy and Physiology* [chapter 15 \("The Urinary System"\)](#).

Click on the chapter summary section and read the summary of the above section. Continue to the end-of-chapter questions and answer questions 4–8, 12, and 17–20. Review material whenever you are unable to answer a question with confidence.

Go to the Anatomy and Physiology Part II Message Board and discuss pertinent insights with your peers.

Daily Urine Production

Given your new knowledge of the influence of fluid intake on urine formation, what do you think happens when a person becomes overhydrated? Who do you think is most vulnerable to overhydration?

For more information, visit the [Merck Manual](#) website and read about overhydration.

Modify Concept Map: Fluid Balance

Go back to your initial concept map and add or modify it. Be sure you can include the following terms and show connections between these terms:

- urine production
- urine output
- urine osmolarity
- water loading
- ADH
- plasma osmolarity

Fluid Intake and Urine Output Exercise

Go to [TaskStream](#) and complete task 211.3.3-01-05.

Note: Once you begin the laboratory report in PowerPhys, you cannot return to the information or data-collection sections, or you will lose your data and answers in the report. Save your completed report as a PDF, review the rubric for the task, and submit it in TaskStream.

Oxygenation

In the previous subject you learned about the affect on fluid balance when you go on a long run or fast walk when it is hot and humid. By the end of the run or walk, you might also be breathing faster and shallower or even gulping for air. This is the result of a lack of oxygen getting to your cells.

This is the second example of the body's ability to maintain homeostasis—oxygenation. Many people cannot explain what happens at the cellular level when you are experiencing shortness of breath or light headedness due to exertion. But to fully understand oxygenation and



homeostasis, it is important to understand how the cells use oxygen.

Oxygenation

The optimum oxygen saturation needed for life is 98–99%, but did you know that the Himalayan Sherpas can function well with oxygenation levels that are dramatically lower? These facts indicate that although there is a need for proper oxygenation, the optimum levels can vary based on adaptation.

Initial Concept Map: Oxygenation

Make a concept map on oxygenation. What systems are involved? What role does the cell play? Use your notes to document your thoughts.

Physiology of the Heart and Circulation

Access the following in the *Essentials of Human Anatomy and Physiology* learning resource:

- chapter 11 ("Physiology of the Heart and Physiology of Circulation")

First try to answer all the self-assessment questions offered under the arrow pointing to "DID YOU GET IT?" If you are unable to answer a question, review the *Essentials of Human Anatomy and Physiology* [chapter 11 \("The Cardiovascular System"\)](#).

Click on the chapter summary and read the entire summary section. Continue on to the end-of-chapter questions and answer questions 2–6, 15, 23, 25, 37–39, 44, 45, and 50. Review material whenever you are unable to answer a question with confidence.

Be prepared to discuss the content in the Anatomy and Physiology Part II Message Board.

Respiratory Physiology

Access the following in the *Essentials of Human Anatomy and Physiology* learning resource:

- chapter 13 ("Respiratory Physiology")

First try to answer all the self-assessment questions offered under the arrow pointing to "DID YOU GET IT?" If you are unable to answer a question, review *Essentials of Human Anatomy and Physiology* [chapter 13 \("The Respiratory System"\)](#).

Click on the chapter summary and read the summary of the above section. Continue to the end-of-chapter questions, and answer questions 15–24 and 29. Review material whenever you are unable to answer a question with confidence.

Go to the in the Anatomy and Physiology Part II Message Board and discuss pertinent insights with your peers.

Cardiac Output

Given your new knowledge about cardiac output, explain to a friend or family member why urine output is a good indicator of cardiac output given normal kidney function.



Respiratory Volume

Given your new knowledge about respiratory volume, do you think that pregnant women living at a high altitude would have a different respiratory volume than pregnant women living at sea level? Conduct a search on the Internet to learn more about this if necessary. Be sure you can explain it to a friend or family member.

Modify Concept Map: Oxygenation

Go back to your initial concept map on oxygenation. Be sure you can accurately include the following terms:

- heart rate
- stroke volume
- cardiac cycle
- cardiac volume
- end-diastolic volume
- end-systolic volume
- minute ventilation
- arterial partial pressure of carbon dioxide
- arterial partial pressure of oxygen
- blood pH
- tidal volume
- hypercapnia
- hypoxemia
- respiratory volumes
- respiratory capacities
- lung capacities
- lung volumes

Show interactions and causal relationships among these terms.

Exercises on Oxygenation

Go to [TaskStream](#) and complete task 211.3.4-01-14.

Note: Once you begin the laboratory report in PowerPhys, you cannot return to the information or data-collection sections, or you will lose your data and answers in the report. Save your completed report as a PDF, review the rubric for the task, and submit it in TaskStream.

Mobility

After an accident Ted was left paralyzed from the waist down. Ted had been very active prior to the accident, often taking part in marathons and playing sports. Since the initial trauma of the accident, Ted has decided he would like to engage in some of the activities he did previously. What is the state of Ted's muscles and nerves? How could Ted participate in athletic trials?

Understanding mobility requires an understanding of how muscles work in the body. Ted's



physical therapist is working with Ted to regain some mobility and to strengthen other muscles to allow Ted more mobility.

The activities associated with this subject will introduce you to the mechanisms of muscle movement and mobility.

Mobility

Approximately half the body's mass is made up of muscle. Muscle is the dominant tissue in the heart and in the walls of other hollow organs of the body. Muscle tissue has the unique ability to contract or shorten muscles. This characteristic is essential for all body movement, including movement in such systems as the digestive system, the cardiovascular system, and the renal system.

Initial Concept Map: Mobility

Make a concept map of everything you now know about mobility. Include organs and systems of the body involved in mobility. Outline as many connections and causal relationships as possible.

Anatomy of Skeletal Muscle and Skeletal Muscle Activity

Access the following in the *Essentials of Human Anatomy and Physiology* learning resource:

- chapter 6 ("Microscopic Anatomy of Skeletal Muscle and Skeletal Muscle Activity")

First try to answer all the self-assessment questions offered under the arrow pointing to "DID YOU GET IT?" If you are unable to answer a question, review *Essentials of Human Anatomy and Physiology* [chapter 6 \("The Muscular System"\)](#).

Go to the chapter summary section and read the summary of the above section. Continue to the end-of-chapter questions and answer questions 1, 2, 14–16, 34, 35, and 37. Review material whenever you are unable to answer a question with confidence.

Go to the in the Anatomy and Physiology Part II Message Board and discuss pertinent insights with your peers.

Muscle Contraction

Given your new knowledge of the mechanism of muscle contraction, use the "[Types of Contractions](#)" web page to draw diagrams to show the four types of muscle contractions:

1. concentric
2. eccentric
3. isometric
4. passive

Use arrows or other symbols to show action.

Modify Concept Map: Mobility

Go back to your original concept map. Add to or modify it. Be sure to add new terms and new



relationships.

Twitch Contractions and Summation Simulation

Go to [TaskStream](#) and complete task 211.3.5-01-06.

Note: Once you begin the laboratory report in PowerPhys, you cannot return to the information or data-collection sections, or you will lose your data and answers in the report. Save your completed report as a PDF, review the rubric for the task, and submit it in TaskStream.

Final Steps

Congratulations on completing the activities in this course of study! This section will guide you through the assessment process.

Assessment Information

The activities in this course of study have prepared you to complete the AOT1 performance assessment. If you have not already completed the assessment, you will do so now.

Accessing Performance Assessments

You should have completed the following tasks as you worked through this course of study. If you have not completed the tasks in [TaskStream](#), do so now. For help on using Taskstream for submitting your performance assessments, please watch the [Using TaskStream](#) video found in the WGU Channel.

- AOT1: Task 211.3.1-01-05
- AOT1: Task 211.3.2-01-06
- AOT1: Task 211.3.3-01-5
- AOT1: Task 211.3.4-01-14
- AOT1: Task 211.3.5-01-06

For directions on how to receive access to performance assessments, see the "[Accessing Performance Assessments](#)" page.

Feedback

WGU values your input! If you have comments, concerns, or suggestions for improvement of this course, please submit your feedback using the following form:

- [Course Feedback](#)

ADA Policy

Western Governors University recognizes and fulfills its obligations under the Americans with Disabilities Act of 1990 (ADA), the Rehabilitation Act of 1973 and similar state laws. Western Governors University is committed to provide reasonable accommodation(s) to qualified disabled learners in University programs and activities as is required by applicable law(s). ADA Support Services serves as the principal point of contact for students seeking accommodations and can be contacted at ADASupport@wgu.edu. Further information on WGU's ADA policy



and process can be viewed in the student handbook at the following link:

- [Policies and Procedures for Students with Disabilities](#)