



This course supports the assessment for ALT1. The course covers 10 competencies and represents 2 competency units.

Introduction

Overview

The word *science* itself is derived from a Latin word meaning "to know." What better way for one to know a biological science than through observation and experimentation.

After you have begun this process, you will begin to appreciate the relevance of performing lab work to understanding how the body works and how you can apply this knowledge to the profession of nursing. You will have working knowledge of what goes on under the skin, so to speak. Also, as you have gained competency in technical skills, your competence may translate to clinical skills in the healthcare setting. For example, measuring solutions in a lab requires precision, and this precision will be a needed skill for pouring liquid medications prior to administration.

Watch the following video for an introduction to this course:

Note: To download this video, right-click the following link and choose "Save as...": [download video](#).

Competencies

This course provides guidance to help you demonstrate the following 10 competencies:

- **Competency 211.4.1: Histology**
The graduate identifies major tissues of the body using the microscope, describes the role of histology in understanding anatomy and physiology, and recognizes how structure affects function in the tissues of the body.
- **Competency 211.4.2: Body Membranes**
The graduate completes microscopic examinations of the membranes of the body, describes membranes, their function and location, and recognizes how disease affects the membranes of the body.
- **Competency 211.4.3: Joints and Movement**
The graduate uses laboratory movement, observation and dissection to investigate the structure and function of joints and describes the effect of injury on joints.
- **Competency 211.4.4: Nervous System**
The graduate recognizes major structures of the nervous system, completes dissection of a sheep brain and eye, and recognizes the relationships between taste and smell, and hearing and balance.
- **Competency 211.4.5: Endocrine System**
The graduate recognizes how the structure of endocrine glands relates to function, can explain how hormones maintain homeostasis, and describes the effect of disease on the working of the endocrine system.



- **Competency 211.4.6: Cardiovascular System**

The graduate identifies common components of the blood and cardiovascular system, determines blood type and Rh, and describes the structure and function of the heart and blood vessels.

- **Competency 211.4.7: Respiratory System**

The graduate identifies the structures of the respiratory system, distinguishes normal from diseased respiratory tissue, defines and measures lung functional capacities, and explains how disease affects the respiratory system.

- **Competency 211.4.8: Digestive System**

The graduate identifies structures of the digestive system, relates structure to function, explains how enzymes affect digestion, and explains how disease affects the structure and function of the digestive tract.

- **Competency 211.4.9: Urinary System**

The graduate identifies structures of the urinary system, relates structure to function, completes a urinalysis, and explains the effect of disease on the urinary system.

- **Competency 211.4.10: Reproductive System**

The graduate identifies structures of the male and female reproductive systems, compares spermatogenesis and oogenesis, recognizes stages and characteristics of normal human development, and discusses how disease affects the reproductive system.

Course Instructor Assistance

As you prepare to successfully demonstrate competency in this subject, remember that course instructors stand ready to help you reach your educational goals. As subject matter experts, mentors enjoy and take pride in helping students become reflective learners, problem solvers, and critical thinkers. Course instructors are excited to hear from you and eager to work with you.

Successful students report that working with a course instructor is the key to their success. Course instructors are able to share tips on approaches, tools, and skills that can help you apply the content you're studying. They also provide guidance in assessment preparation strategies and troubleshoot areas of deficiency. Even if things don't work out on your first try, course instructors act as a support system to guide you through the revision process. You should expect to work with course instructors for the duration of your coursework, so you are welcome to contact them as soon as you begin. Course instructors are fully committed to your success!

Preparing for Success

The information in this section is provided to detail the resources available for you to use as you complete this course.

Learning Resources

The learning resources listed in this section are required to complete the activities in this course. For many resources, WGU has provided automatic access through the course. However, you may need to manually enroll in or independently acquire other resources. Read the full instructions provided to ensure that you have access to all of your resources in a timely manner.

Automatically Enrolled Resources



You can access the learning resources listed in this section by clicking on the links provided throughout the course. You may be prompted to log in to the WGU student portal to access the resources.

VitalSource E-Texts

The following textbooks are available to you as e-texts within this course. You will be directly linked to the specific readings required within the activities that follow.

- Marieb, E. N. (2009). *Essentials of human anatomy and physiology* (9th ed.). San Francisco: Pearson Benjamin Cummings. ISBN 0321513533

Note: These e-texts are available to you as part of your program tuition and fees, but you may purchase hard copies at your own expense through a retailer of your choice. If you choose to do so, please use the ISBN listed to ensure that you receive the correct edition.

Note: Web content links in the Essentials of Human Anatomy and Physiology text are disabled in this e-text edition and can be skipped for this course.

Enroll in Learning Resources

Take a moment to enroll in the learning resources listed in this section. To enroll, navigate to the "Learning Resources" tab, click the "Sections" button, and then click the "Enroll Now" button for each resource. Once your mentor approves your enrollment in the resource, you will receive an e-mail with further access instructions. Contact your mentor if you have questions.

LabPaq

The "Anatomy and Physiology" LabPaq from Hands-On Labs is a physical shipment. This lab kit (LabPaq) is covered by your program lab fee and is required to complete the performance assessment. This kit includes the following lab manual: Vass, L. & Hands-On Labs (2012) *A laboratory manual of small-scale experiments for the independent study of Anatomy and Physiology* (1st Ed.). Sheridan, CO: Hands-On Labs, Inc. ISBN: 9781866151246.

You will receive an email with instructions for ordering the LabPaq from the Learning Resources department. If you have any questions about ordering the LabPaq, please contact the Learning Resources department at learning@wgu.edu or by calling 866-903-0110.

Please note that the LabPaq will contain a fetal pig, a sheep heart, a sheep brain, and a sheep kidney to dissect. Dissections are a required component of this assessment.

Additional Preparation

Nursing Standards

You will be able to access Nursing Professional Standards as they apply to your program through the WGU Library. Please access these documents at the following website:

- [Nursing Standards E-Reserves](#)



Before you begin your first laboratory assignment, you will need to download [the lab manual](#). You are responsible for reading the following sections of the [LabPaq lab manual](#):

- "Preface"
- "Introduction"
- "Studying Anatomy and Physiology"
- "Required Equipment and Supplies"
- "Laboratory Techniques"
- "Laboratory Safety Procedures"
- "Science Lab Safety Reinforcement Agreement"

Make certain you have submitted your signed [Lab Safety Reinforcement Agreement](#) from the LabPaq Manual to the course facilitator.

Pacing Guide

The pacing guide suggests a weekly structure to pace your completion of learning activities. It is provided as a suggestion and does not represent a mandatory schedule. Follow the pacing guide carefully to complete the course in the suggested timeframe.

- [Pacing Guide: Anatomy and Physiology II Labs](#)

Note: This pacing guide does not replace the course. Please continue to refer to the course for a comprehensive list of the resources and activities.

Structure, Function and Diseases of Tissue, Membranes and Joints

Have you ever studied parts of the human body in a laboratory setting? If not, you will now have a chance to observe organic material more closely.

The activities associated with this subject will introduce you to the framework of the human body. The course provides technical as well as other learning resources to increase understanding of human structure and function.

Body Membranes, Joints, and Movement

The framework of the human body is composed of tissue cells, membranes, and bones that literally hold it together. These systems serve to protect, support, and bind the body together while allowing the necessary motion and fluidity the body requires in a constantly changing environment.

This topic addresses the following competencies:

- **Competency 211.4.1: Histology**
The graduate identifies major tissues of the body using the microscope, describes the role of histology in understanding anatomy and physiology, and recognizes how structure affects function in the tissues of the body.
- **Competency 211.4.2: Body Membranes**



The graduate completes microscopic examinations of the membranes of the body, describes membranes, their function and location, and recognizes how disease affects the membranes of the body.

- **Competency 211.4.3: Joints and Movement**

The graduate uses laboratory movement, observation and dissection to investigate the structure and function of joints and describes the effect of injury on joints.

Assigned Reading

Read the following sections in *Essentials of Human Anatomy and Physiology*:

- ["Body Tissue" in chapter 3 \("Cells and Tissues"\)](#)
- ["Developmental Aspects of Cells and Tissues" in chapter 3 \("Cells and Tissues"\)](#)

Tissue and Membranes

Because the human body is so dependent on the health of its membranes, consider the consequences when an alteration in membrane structure or function exists. Access the American Journal of Respiratory and Critical Care Medicine website to read about thickening of the respiratory membrane in the following article:

- ["Early Thickening of the Reticular Basement Membrane in Children with Difficult Asthma"](#)

Histology Laboratory

Go to the Histology experiment in the lab manual. The images for this experiment are available on the [Hands-on labs A&P 1](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 1

For details about this performance assessment, see the "Assessment" tab in this course.

Membranes Laboratory

Go to the Classification of Body Membranes experiment in of the [lab manual](#).

The images for this experiment are available on the [Hands-on labs A&P 1](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 2

For details about this performance assessment, see the "Assessment" tab in this course.

Connecting New Knowledge of Tissue and Membranes

Having read about the effect of thickened membranes on the oxygen exchange in the lungs, can you think of other places in the body where damage to a membrane would be detrimental?



Access the following webpage and study about tympanic membrane perforation:

- ["Tympanic Membrane Perforation - Tympanoplasty"](#)

Assigned Reading: Joints

Read the following sections in *Essentials of Human Anatomy and Physiology*:

- ["Joints" in chapter 5 \("The Skeletal System"\)](#)

Joints and Movement Laboratory

Go to the Joints and Body Movements exercise in the [lab manual](#).

The images for this experiment are available on the [Hands-on labs A&P 1](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 3

For details about this performance assessment, see the "Assessment" tab in this course.

Connecting New Knowledge of Joints and Movement

Think of reasons why joint replacement surgery is on the rise and is now one of the major causes of hospitalization. Do a quick Internet search and see if your thoughts match what the experts are saying. Do you think joint replacement is a good thing? What, if anything, can be done to lessen the need for joint replacement? Record your answers in your notebook.

Structures, Functions, and Diseases of the Nervous System and the Endocrine System

Both the nervous system and the endocrine system are complex and essential regulators of body activity. While the nervous system regulates through electrical impulses and neurotransmitters, the endocrine system regulates through the secretion of hormones and enzymes which influence growth, development, and metabolic activities. Homeostasis is the term used to describe body regulation. Ideally, all body systems work together to achieve this state, yet when this does not happen, dysfunction can occur in many organ systems. The activities associated with this subject will introduce you to the regulating systems of the human body.

The Nervous and Endocrine Systems

The nervous system and endocrine systems are not isolated in any one section of the body, but interact throughout the body and between systems. Understanding how they work requires you to think in causal relationships. It is important to think beyond structures as you did in Anatomy and Physiology I and begin to see the interactions and relationships. The labs in this section will help you to not only visualize the systems, but to think more deeply about how they work.

This topic addresses the following competencies:



- **Competency 211.4.4: Nervous System**

The graduate recognizes major structures of the nervous system, completes dissection of a sheep brain and eye, and recognizes the relationships between taste and smell, and hearing and balance.

- **Competency 211.4.5: Endocrine System**

The graduate recognizes how the structure of endocrine glands relates to function, can explain how hormones maintain homeostasis, and describes the effect of disease on the working of the endocrine system.

Assigned Reading: The Nervous System

Read the following in *Essentials of Human Anatomy and Physiology*:

- [chapter 7 \("The Nervous System"\)](#)

Post a message in the Anatomy and Physiology II Message Board.

Organization of Nervous Tissue Laboratory

Go to the Organization of Nervous Tissue exercise in the [lab manual](#).

The images for this experiment are available on the [Hands-on labs A&P 1](#) webpage.

Gross Anatomy of the Nervous System Laboratory

Go to the Gross Anatomy of the Central Nervous System exercise in the [lab manual](#).

The images for this experiment are available on the [Hands-on labs A&P 1](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 4

For details about this performance assessment, see the "Assessment" tab in this course.

Assigned Reading: Endocrine Organs

Read the following section in *Essentials of Human Anatomy and Physiology*:

- ["The Major Endocrine Organs" through the "Thymus Gland" in chapter 9 \("The Endocrine System"\)](#)

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

Endocrine System Laboratory

Go to the Endocrine System exercise in the [lab manual](#). The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Complete the following task in Taskstream:



- Anatomy and Physiology Labs: Task 5

For details about this performance assessment, see the "Assessment" tab in this course.

Connecting New Knowledge of the Nervous System

Consider the size of the human brain and its percentage of the mass of the human body. Do you believe that human intelligence is related to brain size? Access the following webpage to see a chart that compares the human brain with other animal brains:

- ["Mass of a Human Brain"](#)

Connecting New Knowledge of the Endocrine System

Consider the controversy associated with hormone therapy used as an anti-aging therapy. To learn about this therapy, do an Internet search using the keywords *HGH* and *anti-aging*. What are your views? Would you consider hormone therapy to maintain your muscle strength as you age? Record your answers in your notebook.

Structures, Functions, and Diseases of the Vascular and Cardiovascular Systems

Cardiovascular diseases, which include high blood pressure, heart disease, and stroke, are responsible for 40% of deaths annually. Almost everyone knows someone who has been affected. The circulatory pathways of the vascular system allow oxygen and essential nutrients to be delivered to every cell in the human body. It is an integral part of every organ. The study of anatomy and physiology begins with understanding the cardiovascular system from the characteristics of a single oxygen-carrying blood cell to the electrical impulses that control cardiac rhythm.

Cardiovascular System

The doctor has just told you that you have high cholesterol and that this is a dangerous situation that puts you at risk for heart and circulatory disease. What does the doctor mean? What is cholesterol? What is heart disease? What does it mean to be at risk? In order to understand disease, it is important first to understand how the heart and circulatory system work.

This topic addresses the following competencies:

- **Competency 211.4.6: Cardiovascular System**

The graduate identifies common components of the blood and cardiovascular system, determines blood type and Rh, and describes the structure and function of the heart and blood vessels.

Assigned Reading: Cardiovascular System

Read the following chapter in *Essentials of Human Anatomy and Physiology*:

- [chapter 10 \("Blood"\)](#)

Blood Laboratory



Go to the Cardiovascular System: Blood exercise in of the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Heart Laboratory

Go to the Cardiovascular System: The Heart exercise in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 6

For details about this performance assessment, see the "Assessment" tab in this course.

Assigned Reading: Anatomy of the Heart

Read the following sections in *Essentials of Human Anatomy and Physiology*:

- ["Anatomy of the Heart" in chapter 11 \("The Cardiovascular System"\)](#)
- ["Microscopic Anatomy of Blood Vessels" in chapter 11 \("The Cardiovascular System"\)](#)
- ["Gross Anatomy of Blood Vessels" in chapter 11 \("The Cardiovascular System"\)](#)

Blood Vessels Laboratory

Go to the Cardiovascular System: Blood Vessels in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Connecting New Knowledge of the Cardiovascular System

What do you think about a drug that can cause the heart to beat so fast that the cardiac tissue cannot receive all the oxygen it needs? What about a drug that interferes with cardiac rhythm? If you are not familiar with this so-called "recreational" drug, read the following website:

- ["Cocaine, Marijuana, and Other Drugs"](#)

What kind of drug user is most vulnerable to cardiac damage from using recreational drugs?

Connecting New Knowledge of Human Blood

What part of the general population is more vulnerable to developing anemia and why? Read the following webpage:

- ["Who is At Risk for Anemia"](#)

Structures, Functions, and Diseases of the Respiratory and Digestive Systems



Rarely are the digestive system and respiratory system discussed together. However, try running up and down the steps until your breathing becomes fast and shallow. It is easy to see that your lungs are involved. But what role does the digestive system play? We often forget that for our cells to produce energy, we need both oxygen and glucose. The activities associated with this subject will introduce you to the respiratory and digestive systems in the human body.

Respiratory and Digestive Systems

Both the respiratory and digestive systems encompass a large number of organs and anatomical structures that connect the human body with the external world, bringing in nutrients and expelling waste products. Because these two systems are in constant contact with the environment, they are excellent portals for disease-causing organisms.

This topic addresses the following competencies:

- **Competency 211.4.7: Respiratory System**

The graduate identifies the structures of the respiratory system, distinguishes normal from diseased respiratory tissue, defines and measures lung functional capacities, and explains how disease affects the respiratory system.

- **Competency 211.4.8: Digestive System**

The graduate identifies structures of the digestive system, relates structure to function, explains how enzymes affect digestion, and explains how disease affects the structure and function of the digestive tract.

Assigned Reading: Respiratory System

Read the following section in *Essentials of Human Anatomy and Physiology*:

- ["Functional Anatomy of the Respiratory System" in chapter 13 \("The Respiratory System"\)](#)

Respiratory System Laboratory

Go to the Anatomy of the Respiratory System exercise in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 7

For details about this performance assessment, see the "Assessment" tab in this course.

Assigned Reading: Digestive System

Read the following sections in *Essentials of Human Anatomy and Physiology*:

- ["Anatomy of the Digestive Tract" in chapter 14 \("The Digestive System and Body Metabolism"\)](#)
- ["Nutrition" in chapter 14 \("The Digestive System and Body Metabolism"\)](#)



- ["Dietary Sources" in chapter 14 \("The Digestive System and Body Metabolism"\)](#)

Digestive System Laboratory

Go to the Digestive System exercise in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 8

For details about this performance assessment, see the "Assessment" tab in this course.

Connecting New Knowledge of the Respiratory System

Think about the oxygen-carrying capacity of normal hemoglobin. What would happen if the hemoglobin molecule failed to let go of the oxygen molecule when it reached its destination? Can you think of a condition where this happens?

Review the following webpage:

- ["Carbon Monoxide Poisoning"](#)

Connecting New Knowledge of the Digestive System

Access the following webpage:

- ["How Does Digestion Work and How Can I Improve Mine?"](#)

Scroll down about half way until you see the animation under the heading "Digestion." Click on the word "Eat" to see the timeline of digestion.

Structures, Functions, and Diseases of the Urinary and Reproductive Systems

The anatomy of both the urinary and reproductive systems of both males and females is integrated. It is not easy to completely separate them and often what affects one could have an effect on the other. Understanding these relationships as well as the structures is therefore very important.

The activities associated with this subject will introduce you to the urinary and reproductive systems of the human body. What do you already know about these systems in terms of structure and function? What microscopic structures are particularly important in each system?

Urinary and Reproductive Systems

The urinary system is the great regulator of acid-base homeostasis as the kidneys reabsorb water, sodium, bicarbonate, potassium, calcium, and more. It also releases essential hormones. The reproductive system reaches far beyond the reproductive organs to the hypothalamus and



pituitary glands in the brain. The complex relationship between organs and hormones influence reproduction, growth, and development throughout human life.

This topic addresses the following competencies:

- **Competency 211.4.9: Urinary System**

The graduate identifies structures of the urinary system, relates structure to function, completes a urinalysis, and explains the effect of disease on the urinary system.

- **Competency 211.4.10: Reproductive System**

The graduate identifies structures of the male and female reproductive systems, compares spermatogenesis and oogenesis, recognizes stages and characteristics of normal human development, and discusses how disease affects the reproductive system.

Assigned Reading: Urinary System

Read the following sections in *Essentials of Human Anatomy and Physiology*:

- ["Kidneys and Ureters" in chapter 15 \("The Urinary System"\)](#)
- ["Urinary Bladder" in chapter 15 \("The Urinary System"\)](#)
- ["Urethra" in chapter 15 \("The Urinary System"\)](#)

Urinary System Laboratory

Go to the Anatomy of the Urinary System exercise in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Laboratory Exercises for Urinalysis

Go to the Urinalysis exercise in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 9

For details about this performance assessment, see the "Assessment" tab in this course.

Assigned Reading: Reproductive System

Read the following sections in *Essentials of Human Anatomy and Physiology*:

- ["Anatomy of the Male Reproductive System" in chapter 16 \("The Reproductive System"\)](#)
- ["Anatomy of the Female Reproductive System" in chapter 16 \("The Reproductive System"\)](#)
- ["Female Reproduction" in chapter 16 \("The Reproductive System"\)](#)

Reproductive System Laboratory



Go to the Reproductive System exercise in the [lab manual](#).

The images needed for this experiment are found on the [Hands-on labs A&P 2](#) webpage.

Complete the following task in Taskstream:

- Anatomy and Physiology Labs: Task 10

For details about this performance assessment, see the "Assessment" tab in this course.

Connecting New Knowledge of the Urinary System

Can you think of the three simple tests the National Kidney Foundation recommends using to determine the presence of kidney disease? To check your answer, read the following webpage:

- ["Three Simple Tests You Should Ask Your Doctor To Do"](#)

Connecting New Knowledge of the Reproductive System

You may not yet know that the hormone oxytocin is thought to influence maternal behavior, lactation, selective social bonding, and sexual pleasure. It is not surprising that a lot of research is conducted on this hormone. Do a web search using the keyword "oxytocin" and another word that describes emotion such as "affection" or "love" and find out what the buzz is about this hormone.

Final Steps

Congratulations on completing the activities in this course! This course has prepared you to complete the assessment associated with this course. If you have not already been directed to complete the assessment, schedule and complete your assessment now.