Western Technical College

10806177 General Anatomy & Physiology (A&P)

Course Outcome Summary

Course Information

Description	Examines basic concepts of human anatomy and physiology as they relate to health sciences. Using a body systems approach, the course emphasizes the interrelationships between structure and function at the gross and microscopic levels of organization of the entire human body. It is intended to prepare health care professionals who need to apply basic concepts of whole body anatomy and physiology to informed decision-making and professional communication with colleagues and patients. (This course also provides the foundation, and is prerequisite to, Advanced Anatomy and Physiology.)
Instructional Level	Associate Degree Courses
Total Credits	4
Total Hours	90

Textbooks

Open Educational Resource: *Anatomy and Physiology*. 2nd Edition. Copyright 2022. Publisher: Open Stax. **ISBN-13**: 978-1-951693-42-8. https://openstax.org/details/books/anatomy-and-physiology-2e Required.

Learner Supplies

Webcam and microphone. **Vendor:** To be discussed in class. Required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Refine Professionalism: Act Ethically
3. Refine Professionalism: Improve Critical Thinking

4. Refine Professionalism: Participate Collaboratively
5. Refine Professionalism: Practice Effective Communication

Course Competencies

1. Apply descriptive, anatomical, physiological, and directional terminology to the human body and its organization.

Assessment Strategies

1.1. graphic, written or oral product or process
1.2. Written Objective Test
1.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

1.1. you apply anatomical terminology for the anatomical positions used.
1.2. you include directional terminology.
1.3. you describe characteristics and sequences of homeostatic mechanisms.
1.4. you describe location, structure, and function of body cavities and linings.
1.5. you identify body planes, sections, and regions.
1.6. you represent homeostatic mechanisms.

Learning Objectives

1.a. Distinguish between anatomy and physiology.
1.b. Describe the anatomical position.
1.c. Describe the three major planes (Sagittal (parasagittal), frontal (coronal), transverse) of the body or of an organ.
1.d. Identify the major (Dorsal, Ventral, Thoracic) body cavities and their subdivisions.
1.e. Identify the serous membranes that line the walls and cover the organs of each body cavity and the fluid found inside each cavity.
1.f. Describe two ways to subdivide the abdominal region.
1.g. Identify the quadrants of the abdominopelvic cavity.
1.h. Identify the nine abdominal regions.
1.i. Describe the axial and appendicular regions of the body and their subdivisions.
1.j. Use correct directional terms in the study of anatomy and physiology (i.e. Superior/inferior, anterior/posterior, medial/lateral, proximal/distal, superficial/deep).
1.k. Describe the location of specific body organs.
1.l. Match locating terms with the correct descriptions.
1.m. Match body positions with the correct descriptions.
1.n. Define terms related to organization of the human body (i.e. chemical, cell, tissue, organ, organ system, organism).
1.o. Define examples of homeostasis, negative, and positive feedback systems.
1.p. Provide examples of homeostasis, negative, and positive feedback systems.

2. Classify the major chemical components of living things according to their structure and function.

Assessment Strategies

2.1. through a graphic, written or oral product or process
2.2. Written Objective Test
2.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

2.1. you classify all of the major chemical components.
2.2. you correlate components according to structure, function, and the role the major chemical components play in body composition.
2.3. you use appropriate terminology.

Learning Objectives

2.a. Describe the structure of an atom.
2.b. Differentiate among an atom, molecule, compound, ion, and isotopes.
2.c. Describe the various types of chemical bonding.
2.d. Compare and contrast major organic and inorganic compounds and their characteristics.
2.e. Explain the importance or water in living organisms.
2.f. Explain the importance of oxygen and carbon dioxide to living organisms.
2.g. Define enzymes.
2.h. Describe the role of enzymes in cellular metabolism.

3. Characterize the basic structure and functions of the cell and its parts.

Assessment Strategies

3.1. through a written, graphic or oral product or process
3.2. Written Objective Test
3.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

3.1. you identify major components of the cell.
3.2. you identify the major functional components of the cell.
3.3. you identify the major transport mechanisms of the cell membranes.
3.4. you illustrate the relationships among the organelles of a cell.

Learning Objectives

3.a. Identify common characteristics found in most human cells (i.e. Cytosol, nucleus, cell membrane and organelles).
3.b. Describe the structure, function and relationship of all cell organelles.
3.c. Describe the structure of the cell membrane.
3.d. Describe the different modes of transport (active and passive) of substances across cell membranes.

4. Identify how cells store and use energy.

Assessment Strategies

4.1. through a written, graphic or oral product or process
4.2. Written Objective Test
4.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

4.1. you distinguish between aerobic and anaerobic processes.
4.2. you describe metabolic pathways and their relationships to one another.

Learning Objectives

4.a. Define metabolism.
4.b. Distinguish between catabolic and anabolic pathways.
4.c. Contrast aerobic and anaerobic respiration.
4.d. Describe the role of mitochondria in cellular metabolism.

5. Analyze the role of DNA in controlling cell functions.

Assessment Strategies

5.1. through a written, graphic or oral product or process
5.2. Written Objective Test
5.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

5.1. you illustrate the structure of DNA, RNA, and chromosomes.
5.2. you illustrate the cell cycle.
5.3. you describe how DNA and RNA differ.
5.4. you explain the functional relationship between DNA, RNA, and chromosomes.

Learning Objectives

5.a. Describe the structure and function of DNA, RNA, and chromosomes.
5.b. Describe the stages of a cell cycle.
5.c. Relate DNA replication to the cell cycle.

6. Correlate the structure of tissues with their functions.

Assessment Strategies

6.1. through a written, graphic or oral product or process
6.2. Written Objective Test
6.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

6.1. you identify the tissue-based upon the structural components.
6.2. you distinguish among the four types of tissues.
6.3. you relate structural components with tissue functions.

Learning Objectives

6.a. Identify the microscopic anatomy of body tissues.
6.b. Identify the characteristics of each tissue type (i.e. epithelial, connective, muscular, nervous).
6.c. List the functions of each tissue type.
6.d. Give examples of the locations of each tissue type in the body.

7. Analyze how components of the integumentary system function in the body.

Assessment Strategies

7.1. through a written, graphic or oral product or process
7.2. Written Objective Test
7.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

7.1. you identify the structural components of the integumentary system.
7.2. you correlate the structural components of the integumentary system with their functions.
7.3. you identify the major chemical secretions of the integumentary system.
7.4. you illustrate the relationships among the components of the integumentary system.
7.5. you summarize the functions of the integumentary system.

Learning Objectives

7.a. Compare the structures and functions of the layers of the skin.
7.b. Describe the events occuring during keratinization that produce a skin resistant to abrasion and water loss.
7.c. Explain the effects of ultraviolet radiation on the skin.
7.d. Describe the glands of the skin, their secretions and the functions of these secretions, including surface film (acid mantle).
7.e. Describe the way in which the integumentary system helps to regulate body temperature.
7.f. Describe the role of skin in sensation.
7.g. Explain the way in which skin responds to injuries and repairs itself.

8. Analyze how components of the skeletal system function in the body.

Assessment Strategies

8.1. through a written, graphic or oral product or process
8.2. Written Objective Test
8.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

8.1. you identify gross and microscopic structural components of the skeletal system.
8.2. you correlate the structural components of the skeletal system with their functions.
8.3. you identify the major chemical components of the skeletal system.
8.4. you illustrate the relationships among the components of the skeletal system.

8.5. you summarize the functions of the skeletal system.

Learning Objectives

8.a. Describe the functions of the skeletal system.
8.b. Describe the composition and organization of bone matrix.
8.c. List the three types of bone cells and their functions.
8.d. Give examples of each bone classification, according to their shape.
8.e. Describe how the features that characterize spongy and compact bones impact their function.
8.f. Describe bone growth.
8.g. Explain the role of bone in calcium homeostasis.
8.h. Explain how and when bone remodeling occurs.
8.i. Describe the different types of joints and how they work.
8.j. Apply movement terminology to joint functions.
8.k. Identify the components and functions of the axial and appendicular skeleton.
8.l. Relate the major landmarks on individual bones of the skeleton to their function.
8.m. Discuss the process of skull development.
8.n. Identify the differences in structure and function of the various vertebrae.
8.o. Describe the skeletal differences between males and females.

9. Analyze how components of the muscular system function in the body.

Assessment Strategies

9.1. through a written, graphic or oral product or process
9.2. Written Objective Test
9.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

9.1. you identify the gross and microscopic structural components of the muscular system.
9.2. you correlate the structural components of the muscular system with their functions.
9.3. you identify the major muscles and their functions.
9.4. you illustrate the relationships among the components of the muscular system.
9.5. you summarize the functions of the muscular system.

Learning Objectives

9.a. Describe the characteristics and functions of muscular tissue.
9.b. Explain the organization of muscle at the tissue level.
9.c. Distinguish among the different types of muscle contractions.
9.d. Relate types of muscle fibers to muscular performance.
9.e. Identify the major human skeletal muscles and their actions.
9.f. Define origin, insertion, agonist and antagonist, prime mover, and synergist.

10. Analyze how components of the nervous system function in the body.

Assessment Strategies

10.1. through a written, graphic or oral product or process
10.2. Written Objective Test
10.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

10.1. you identify the gross and microscopic structural components of the nervous system.
10.2. you correlate the structural components of the nervous system with their functions.
10.3. you correlate cranial nerves to their respective physiological functions.
10.4. you relate higher order brain functions to brain anatomy.
10.5. you illustrate the relationships among the components of the nervous system.
10.6. you summarize the functions of the nervous system.
10.7. you identify the gross and microscopic structural components of the somatic and special senses.
10.8. you correlate the structural components of the somatic and special senses with their functions.

Learning Objectives

10.a. Describe the anatomical organization and general functions of the nervous system.

10.b. Distinguish between neurons and neuroglia by comparing their structures and functions.
10.c. Explain how the brain and spinal cord are protected.
10.d. Describe the major regions of the brain (including lobes), their structure and functions.
10.e. Distinguish among the motor, sensory, and association areas of the cerebral cortex.
10.f. Discuss the structure and function of the spinal cord and spinal nerves.
10.g. Explain the role of white matter and gray matter in processing and relaying sensory and motor information.
10.h. Describe the process of a neural reflex.
10.i. Identify the principle sensory and motor pathways.
10.j. Differentiate between the somatic and autonomic divisions based on their respective structures and functions.
10.k. Identify the cranial nerves and their functions.
10.l. Contrast the functions of the sympathetic and parasympathetic divisions of the autonomic nervous system.
10.m. Discuss the receptors and processes involved in the senses of smell and taste.
10.n. Describe the structures of the ear and their roles in the process of hearing.
10.o. Describe the structures and processes involved in maintaining equilibrium.
10.p. Describe the structures of the eye and their functions.
10.q. Explain the mechanism of vision.
10.r. Differentiate between resting and action potential.

11. Correlate the major organs of the endocrine system with their function in the body.

Assessment Strategies

11.1. through a written, graphic or oral product or process
11.2. Written Objective Test
11.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

11.1. you identify the endocrine organs and their associated hormones.
11.2. you identify the general functions of the hormones.
11.3. you illustrate the relationships among the components of the endocrine system.
11.4. you summarize the functions of the endocrine system.

Learning Objectives

11.a. Explain the general functions of the endocrine system.
11.b. Differentiate between the two chemical families of hormones.
11.c. Explain the control mechanisms of hormonal secretion.
11.d. Identify the role of the hypothalamus in the endocrine system.
11.e. Describe the functions and effects of hyposecretion and hypersecretion of major hormones.
11.f. Compare the roles of the endocrine and nervous systems in maintaining homeostasis.
11.g. Describe the endocrine and nervous systems response to stress.

12. Analyze how components of the cardiovascular system function in the body.

Assessment Strategies

12.1. through a written, graphic or oral product or process
12.2. Written Objective Test
12.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

12.1. you identify major gross and microscopic structural components of the cardiovascular and lymphatic systems.
12.2. you describe the flow of fluid through the systemic, pulmonary, and lymphatic circulations.
12.3. you illustrate the functional relationships among the cardiovascular and lymphatic components.
12.4. you describe the microscopic components of blood.
12.5. you summarize the functions of blood and each of its components.
12.6. you describe the basis for blood-typing.
12.7. you describe relationship between blood, tissue, and lymphatic fluids.

Learning Objectives

12.a. Identify the names and locations of the major parts of the heart.
12.b. Explain the function(s) of each of the major parts of the heart.
12.c. Trace the pathway of the blood through the heart and lungs.
12.d. Compare the structures and functions of the major types of blood vessels.
12.e. Describe the mechanisms that aid in returning venous blood to the heart.
12.f. Describe the general characteristics and functions of blood.
12.g. Distinguish among the types and functions of the formed elements of the blood.
12.h. Explain the control of red blood cell production.
12.i. Explain the mechanisms that help to achieve hemostasis.
12.j. Define coagulation.
12.k. Describe the basis of blood typing, ABO, Rh compatibility, and transfusions.
12.l. Describe the general characteristics and functions of the lymphatic system.
12.m. Describe the location of the major lymphatic pathways.
12.n. Describe the formation of tissue fluid and lymph.
12.o. Explain lymphatic circulation maintenance and the consequences of an obstruction.
12.p. Describe major functions of the lymph nodes, thymus, and spleen.
12.q. Define immunity.
12.r. Relate the role of the lymphatic system to immunity.

13. Analyze how components of the digestive system function in the body.

Assessment Strategies

13.1. through a written, graphic or oral product or process
13.2. Written Objective Test
13.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

13.1. you identify the gross and microscopic structural components of the digestive system.
13.2. you correlate the structural components of the digestive system with their functions.
13.3. you describe the functions of major digestive enzymes.
13.4. you summarize the functions of the digestive system.

Learning Objectives

13.a. Describe the parts and functions of the digestive system organs.
13.b. Describe the functions of major digestive enzymes (ex. pepsin, amylase, ptyalin, and lipase).
13.c. Describe the mechanisms of swallowing, vomiting, and defecating.
13.d. List and describe the general function of major secretions of the digestive system.

14. Analyze how components of the respiratory system function in the body.

Assessment Strategies

14.1. through a written, graphic or oral product or process
14.2. Written Objective Test
14.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

14.1. you identify the gross and microscopic structural components of the respiratory system.
14.2. you correlate the structural components of the respiratory system with their functions.
14.3. you explain the mechanics of ventilation with reference to respiratory volumes and capacities.
14.4. you summarize the functions of the respiratory system.

Learning Objectives

14.a. Describe the locations, structures and functions of the organs of the respiratory system.
14.b. Describe the mechanics of breathing.
14.c. Define respiratory air volumes and capacities.
14.d. Explain the mechanism of respiratory control and factors that may influence it.

15. Analyze how the components of the urinary system function in the body.

Assessment Strategies

15.1. through a written, graphic or oral product or process
15.2. Written Objective Test
15.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

15.1. you identify the gross and microscopic structural components of the urinary system.
15.2. you correlate the structural components of the urinary system with their functions.
15.3. you illustrate the relationships among the components of the urinary system.
15.4. you summarize the functions of the urinary system.

Learning Objectives

15.a. Describe the general functions of the urinary system and its anatomical components.
15.b. Explain the functional processes of urine formation, including filtration, reabsorption, secretion, and excretion.

16. Analyze how components of the reproductive systems function in the body.

Assessment Strategies

16.1. through a written, graphic or oral product or process
16.2. Written Objective Test
16.3. in a classroom or laboratory setting

Criteria

You will know you are successful when

16.1. you identify the gross and microscopic structural components of the male and female reproductive systems.
16.2. you correlate the structural components of the male and female reproductive system with their functions.
16.3. you identify the secretions of the male and female reproductive systems and their functions.
16.4. you summarize the functions of the reproductive systems.

Learning Objectives

16.a. Describe the parts and general functions of the male and female reproductive system.
16.b. Explain the way in which hormones control the activities of the reproductive organs and the development of secondary sexual characteristics.
16.c. Describe the similarities between the male and female reproductive system.
16.d. Explain the diploid and haploid cycle in human reproduction.

17. Apply appropriate laboratory methods and safety precautions.

Assessment Strategies

17.1. in the laboratory

Criteria

You will know you are successful when

17.1. you identify hazards and safety equipment in the lab.
17.2. you select appropriate personal protective equipment.
17.3. you follow all laboratory practice expectations of the college.

Learning Objectives

17.a. Describe the appropriate use of the microscope in the lab.
17.b. Describe the appropriate use of safety equipment in the lab
17.c. Demonstrate appropriate handling of prosected human cadavers
17.d. Demonstrate safety procedures in organ dissections.