



Lakeshore Technical College

10-806-177 General Anatomy & Physiology - Online

Course Outcome Summary

Course Information

Description General Anatomy & Physiology 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.)

Total Credits 4

Total Hours 90

Types of Instruction

Instruction Type

Laboratory

Credits/Hours

36 Hours

Lecture

54 Hours

Pre/Corequisites

Prerequisite 10-806-134 General Chemistry or equivalent

Textbooks

McKinley, M. P., O'Loughlin, V. D., & Bidle, T. S. (n.d.). *Anatomy & Physiology: An Integrative Approach*. Publisher: McGraw Hill.

- E-Book: ISBN: 9781259657269 (include McGraw Hill Connect license)
- Loose-Leaf: ISBN: 9781259873744 (include McGraw Hill Connect license)

Learner Supplies

Access to a computer with internet connectivity

Core Abilities

1. Apply learning

Criteria

- 1.1. Learner transfers academic knowledge and principles to life and work situations
- 1.2. Learner incorporates prior learning
- 1.3. Learner knows when to ask for help
- 1.4. Learner demonstrates appropriate safety precautions
- 1.5. Learner identifies the need for lifelong learning
- 1.6. Learner develops the ability to research beyond the required work
- 1.7. Learner demonstrates a curiosity for learning about cultures, norms, and practices

2. Demonstrate responsible and professional workplace behaviors

Criteria

- 2.1. Learner displays behavior consistent with the ethical standards within a discipline or profession
- 2.2. Learner follows policies and procedures
- 2.3. Learner attends class as mandated by the instructor
- 2.4. Learner completes assignments on time
- 2.5. Learner exhibits academic honesty
- 2.6. Learner accepts responsibility and accountability for his/her actions
- 2.7. Learner demonstrates time management and task prioritization
- 2.8. Learner demonstrates ability to handle ambiguity and unfamiliar situations

3. Integrate technology

Criteria

- 3.1. Learner determines which tasks can be performed more efficiently by using technology
- 3.2. Learner uses technology to perform tasks more efficiently
- 3.3. Learner adapts to changing/emerging technology
- 3.4. Learner selects culturally appropriate technology/tools to communicate with diverse groups

Course Competencies

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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 1.1. through a graphic, written or oral product or process
- 1.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 1.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 1.1. graphic, written or oral product/process includes anatomical terminology for the anatomical positions used
- 1.2. graphic, written or oral product/process includes directional terminology
- 1.3. graphic, written or oral product/process portrays the describes characteristics and sequences of homeostatic mechanisms
- 1.4. graphic, written or oral product/process describes location, structure, and function of body cavities and linings
- 1.5. graphic, written or oral product identifies body planes, sections, and regions
- 1.6. graphic, written or oral product accurately represents homeostatic mechanisms

Learning Objectives

- 1.a. Distinguish between anatomy and physiology.
- 1.b. Describe the anatomical position.
- 1.c. Describe the three major planes of the body or of an organ.
- 1.d. Identify the major 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.
- 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.
- 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**

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 2.1. through a graphic, written or oral product or process
- 2.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 2.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 2.1. graphic, written or oral product or process includes all of the major chemical components
- 2.2. graphic, written or oral product or process correlates components according to structure, function, and the role it major chemical components plays in body composition
- 2.3. graphic, written or oral product uses 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. List the body's inorganic compounds and their functions.
- 2.e. Explain the importance of water in living organisms.
- 2.f. Explain the importance of oxygen and carbon dioxide to living organisms.
- 2.g. Describe the body's major organic compounds and their functions.
- 2.h. Define enzymes.
- 2.i. Describe the role of enzymes in cellular metabolism.

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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 3.1. through a written, graphic or oral product or process
- 3.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 3.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 3.1. written, graphic or oral product or process addresses major components of the cell
- 3.2. written, graphic or oral product or process identifies the major functional components of the cell

- 3.3. written, graphic or oral product or process identifies the major transport mechanisms of the cell membranes
- 3.4. written, graphic or oral product or process illustrates the relationships among the organelles of a cell

Learning Objectives

- 3.a. Define cytoplasm and organelle.
- 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 of substances across cell membranes.

4. Identify how cells store and use energy

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 4.1. through a written, graphic or oral product or process
- 4.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 4.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 4.1. written, graphic, or oral product or process distinguishes between aerobic and anaerobic processes
- 4.2. written, graphic, or oral product or process shows 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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 5.1. through a written, graphic or oral product or process
- 5.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 5.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 5.1. written, graphic or oral product or process shows the structure of DNA, RNA, and chromosomes
- 5.2. written, graphic or oral product or process illustrates the cell cycle
- 5.3. written, graphic or oral product or process includes a clear description of how DNA and RNA differ
- 5.4. written, graphic or oral product or process explains 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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors
Integrate technology

Assessment Strategies

- 6.1. through a written, graphic or oral product or process
- 6.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 6.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 6.1. written, graphic or oral product or process identifies the tissue-based upon the structural components
- 6.2. written, graphic or oral product or process distinguishes among the four types of tissues
- 6.3. written, graphic or oral product or process relates structural components with tissue functions

Learning Objectives

- 6.a. Identify the microscopic anatomy of body tissues.
- 6.b. List the characteristics of each tissue type.
- 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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors
Integrate technology

Assessment Strategies

- 7.1. through a written, graphic or oral product or process
- 7.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 7.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 7.1. written, graphic or oral product or process identifies the structural components of the integumentary system
- 7.2. written, graphic or oral product or process correlates the structural components of the integumentary system with their functions
- 7.3. written, graphic or oral product or process identifies the major chemical secretions of the integumentary system
- 7.4. written, graphic or oral product or process illustrates the relationships among the components of the integumentary system
- 7.5. written, graphic or oral product or process summarizes 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 occurring 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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 8.1. through a written, graphic or oral product or process
- 8.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 8.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 8.1. written, graphic or oral product or process identifies gross and microscopic structural components of the skeletal system
- 8.2. written, graphic or oral product or process correlates the structural components of the skeletal system with their functions
- 8.3. written, graphic or oral product or process identifies the major chemical components of the skeletal system
- 8.4. written, graphic or oral product or process illustrates the relationships among the components of the skeletal system
- 8.5. written, graphic or oral product or process summarizes 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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 9.1. through a written, graphic or oral product or process
- 9.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 9.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 9.1. written, graphic or oral product or process identifies the gross and microscopic structural components of the muscular system
- 9.2. written, graphic or oral product or process correlates the structural components of the muscular system with their functions
- 9.3. written, graphic or oral product or process identifies the major muscles and their functions
- 9.4. written, graphic or oral product or process illustrates the relationships among the components of the muscular system
- 9.5. written, graphic or oral product or process summarizes 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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 10.1. through a written, graphic or oral product or process
- 10.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 10.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 10.1. written, graphic or oral product or process identifies the gross and microscopic structural components of the nervous system
- 10.2. written, graphic or oral product or process correlates the structural components of the nervous system with their functions
- 10.3. written, graphic or oral product or process correlates cranial nerves to their respective physiological functions
- 10.4. written, graphic or oral product or process relates higher order brain functions to brain anatomy
- 10.5. written, graphic or oral product or process illustrates the relationships among the components of the nervous system
- 10.6. written, graphic or oral product or process summarizes the functions of the nervous system
- 10.7. written, graphic or oral product or process identifies the gross and microscopic structural components of the somatic and special senses
- 10.8. written, graphic or oral product or process correlates 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, 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.

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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors
Integrate technology

Assessment Strategies

- 11.1. through a written, graphic or oral product or process
- 11.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 11.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 11.1. written, graphic or oral product or process identifies the endocrine organs and their associated hormones
- 11.2. written, graphic or oral product or process identifies the general functions of the hormones
- 11.3. written, graphic or oral product or process illustrates the relationships among the components of the endocrine system
- 11.4. written, graphic or oral product or process summarizes 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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors
Integrate technology

Assessment Strategies

- 12.1. through a written, graphic or oral product or process
- 12.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 12.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 12.1. written, graphic or oral product or process addresses major gross and microscopic structural components of the cardiovascular and lymphatic systems
- 12.2. written, graphic or oral product or process describes the flow of fluid through the systemic, pulmonary, and lymphatic circulations
- 12.3. written, graphic or oral product or process illustrates the functional relationships among the cardiovascular and lymphatic components
- 12.4. written, graphic or oral product or process describes the microscopic components of blood
- 12.5. written, graphic or oral product or process summarizes the functions of blood and each of its components
- 12.6. written, graphic or oral product or process describes the basis for bloodtyping
- 12.7. written, graphic or oral product or process the 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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 13.1. through a written, graphic or oral product or process
- 13.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 13.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 13.1. written, graphic or oral product or process identifies the gross and microscopic structural components of the digestive system
- 13.2. written, graphic or oral product or process correlates the structural components of the digestive system with their functions
- 13.3. written, graphic or oral product or process describes the functions of major digestive enzymes
- 13.4. written, graphic or oral product or process summarizes 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.

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

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

- 14.1. through a written, graphic or oral product or process
- 14.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
- 14.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 14.1. written, graphic or oral product or process identifies the gross and microscopic structural components of the respiratory system
- 14.2. written, graphic or oral product or process correlates the structural components of the respiratory system with their functions
- 14.3. written, graphic or oral product or process explains the mechanics of ventilation with reference to respiratory volumes and capacities

- 14.4. written, graphic or oral product or process summarizes 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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors
Integrate technology

Assessment Strategies

- 15.1. through a written, graphic or oral product or process
15.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
15.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 15.1. written, graphic or oral product or process identifies the gross and microscopic structural components of the urinary system
15.2. written, graphic or oral product or process correlates the structural components of the urinary system with their functions
15.3. written, graphic or oral product or process illustrates the relationships among the components of the urinary system
15.4. written, graphic or oral product or process summarizes the functions of the urinary system

Learning Objectives

- 15.a. Illustrate the gross anatomy of the urinary tract
15.b. Describe general functions of the urinary system and its components
15.c. 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

Linked Core Abilities

Apply learning
Demonstrate responsible and professional workplace behaviors
Integrate technology

Assessment Strategies

- 16.1. through a written, graphic or oral product or process
16.2. by accurately answering questions about the concepts that support this competency in one or more written exams to be scheduled by your instructor at various points throughout this course
16.3. in a classroom or laboratory setting

Criteria

Criteria: Your performance will be successful when:

- 16.1. written, graphic or oral product or process identifies the gross and microscopic structural components of the male and female reproductive systems
16.2. written, graphic or oral product or process correlates the structural components of the male and female reproductive system with their functions
16.3. written, graphic or oral product or process identifies the secretions of the male and female reproductive systems and their functions
16.4. written, graphic or oral product or process summarizes 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. Use appropriate laboratory methods and safety precautions

Linked Core Abilities

Apply learning

Demonstrate responsible and professional workplace behaviors

Integrate technology

Assessment Strategies

17.1. in the laboratory

Criteria

Performance will be 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