

**Common Course Number:** BSC-2023

**Course Title:** Human Biology: Fundamentals of Anatomy and Physiology

**Catalog Course Description:**

*This course provides a basic understanding of the human body, its systems and their functions. It includes the dynamics of physiology, terminology, and physiological relationships of the body systems.*

**Credit Hours Breakdown:** 3 lecture hours

**Prerequisite:** None

**Co requisite:** None

**Course Competencies:**

**Competency 1: The Sciences of Anatomy and Physiology**

Upon successful completion of this course, the student will be able to understand the meaning of these two terms by:

- 1.1 Defining anatomy and physiology, and explaining how they are related.
- 1.2 Defining homeostasis and its mechanisms, and explaining its importance to survival.
- 1.3 Describing a feedback system and differentiating between positive and negative feedback.

## Competency 2: Organization of the Human Body

Upon successful completion of this course, the student will be able to describe how the body is organized by:

- 2.1 Identifying the major regions of the body utilizing appropriate anatomical terminology.
- 2.2 Defining the anatomical planes used to locate parts of the body
- 2.3 Describing the locations of the major body cavities and listing the major organs in each cavity.

## Competency 3: Introductory Chemistry

Upon successful completion of this course, the student will be able to understand the basic knowledge of chemistry as it relates to anatomy and physiology by:

- 3.1 Defining the functions of water, acids, bases, and the concept of pH.
- 3.2 Discussing the functions of carbohydrates, lipids, proteins, and nucleic acids.
- 3.3 Explaining the role of enzymes in living systems.

## Competency 4: Cells and Tissues

Upon successful completion of this course, the student will be able to understand the major cellular organelles and tissue types, and explain their function by:

- 4.1 Identifying the major cellular organelles.
- 4.2 Explaining how substances move into and out of cells.
- 4.3 Describing how a cell divides.
- 4.4 Identifying the four basic tissue types that comprise the human body: epithelial, connective, muscle, and nervous tissues.

## Competency 5: The Integumentary System

Upon successful completion of this course, the student will be able to understand the integumentary system and explain its functions by:

- 5.1 Describing the structure of the skin.
- 5.2 Describing the effects of aging on the integumentary system.

## Competency 6: The Skeletal System

Upon successful completion of this course, the student will be able to understand the skeletal system and explain its functions by:

- 6.1 Describing the factors involved in ossification and bone growth.
- 6.3 Identifying the axial and appendicular divisions and their major bones
- 6.4 Describing the effects of aging on the skeletal system.

## Competency 7: Joints

Upon successful completion of this course, the student will be able to know the different kinds of joints by:

- 7.1 Defining a joint and describing how the structure of a joint determines its function.
- 7.2 Describing the structure of the different type of joints, and how are their functions related.
- 7.3 Explaining the effects of aging on joints.

## Competency 8: The Muscular System

Upon successful completion of this course, the student will be able to understand the muscular system by:

- 8.1 Describing the location, function(s), and characteristics of each type of muscle tissue: smooth, cardiac, and skeletal.
- 8.2 Explaining the major events that occur during muscle fiber contraction.
- 8.3 Describing the sources of ATP and oxygen necessary for muscle contraction.
- 8.4 Describing how exercise affects skeletal muscle.

## Competency 9: Nervous Tissue

Upon successful completion of this course, the student will be able to understand the basic structure of nervous tissue by:

- 9.1 Describing the basic components and general functions of the nervous tissue.
- 9.2 Comparing the structure and function of neurons and neuroglia.
- 9.3 Explaining how nerve impulses are transmitted from neuron to neuron and neuron to muscle.

## Competency 10: The Control Systems: Nervous and Endocrine

Upon successful completion of this course, the student will be able to understand the nervous and endocrine systems by:

- 10.1 Defining central nervous system.
- 10.2 Naming the major parts of the brain and describing the functions of each.
- 10.3 Describing the spinal cord and its function
- 10.4 Listing and defining the major parts of the peripheral nervous system.
- 10.5 Describing the general characteristics of the autonomic nervous system.
- 10.6 Describing the two general mechanisms of hormone action as they relate to neural transmission.
- 10.7 Explaining the relationship between the hypothalamus and the pituitary.
- 10.8 Describing the function(s) of the major endocrine glands.
- 10.9 Explaining how stress affects the nervous and endocrine systems.

## Competency 11: The Cardiovascular System: Blood, Blood Vessels and the Heart

Upon successful completion of this course, the student will be able to understand the cardiovascular system by:

- 11.1 Describing the general characteristics of blood and its major functions.
- 11.2 Listing the types of blood cells and their functions, and blood types.
- 11.3 Naming the organs of the cardiovascular system and discussing their functions.
- 11.4 Tracing the pathway of blood through the heart and lungs.
- 11.5 Comparing the structures and functions of the major types of blood vessels.
- 11.6 Defining cardiac output and how it is regulated.
- 11.7 Identifying the factors that affect blood pressure and vascular resistance.
- 11.8 Explaining the relationship between diet, exercise, and cardiovascular health.

## Competency 12: The Lymphatic and Immune System

Upon successful completion of this course, the student will be able to understand the lymphatic and immune systems by:

- 12.1 Describing the general functions of the lymphatic and immune systems.
- 12.2 Listing the major lymph organs and the functions of each.
- 12.3 Distinguishing between specific and non-specific defenses.
- 12.4 Distinguishing between primary and secondary immune responses.
- 12.5 Distinguishing between active and passive immunity.
- 12.6 Explaining how allergic reactions, tissue rejection reactions, and autoimmunity are related.
- 12.7 Comparing the functions of cell-mediated immunity and antibody-mediated immunity.

### Competency 13: The Respiratory System

Upon successful completion of this course, the student will be able to understand the respiratory system by:

- 13.1 Listing the general functions of the respiratory system.
- 13.2 Describing the structure and functions of each organ of the respiratory system.
- 13.3 Explaining how oxygen and carbon dioxide are carried by the blood and exchanged between the lungs and the tissues.
- 13.4 Describing the respiratory center and its role in inhalation and exhalation.

### Competency 14: The Digestive System

Upon successful completion of this course, the student will be able to understand the digestive system and its related functions by:

- 14.1 Naming and describing the major organs of digestion.
- 14.2 Explaining how food travels through the alimentary canal and discussing the mechanical and enzymatic activity occurring along the GI tract.
- 14.3 Listing and describing the factors that regulate food intake.

### Competency 15: Metabolism and Nutrition

Upon successful completion of this course, the student will be able to understand the roles of metabolism and nutrition by:

- 15.1 Defining metabolism and nutrition, and their roles in homeostasis.
- 15.2 Listing six classes of nutrients and distinguish between nutrients and essential nutrients.
- 15.3 Listing the major sources of carbohydrates, lipids, and proteins and how they are used by the cell(s).
- 15.4 Listing the fat-soluble and the water-soluble vitamins and stating the general functions of each class.
- 15.5 Explaining the importance of diet on health.

## Competency 16: The Urinary System, Fluids, Electrolytes, and Acid-Base Balance

Upon successful completion of this course, the student will be able to understand the urinary system and explain its related functions by:

- 16.1 Listing the organs of the urinary system .
- 16.2 Describing the structure of a kidney and discussing filtration, reabsorption, and secretion.
- 16.3 Discussing why kidneys are considered to be our most important homeostatic organ.
- 16.4 Describing the hormones affecting the kidneys, such as erythropoietin, aldosterone and ADH.
- 16.5 Listing the normal and abnormal components of urine, and discussing the importance of water and electrolyte balance.
- 16.6 Describing the various fluid compartments of the body and comparing their electrolyte composition.
- 16.7 Discussing the significance of physiological buffering by the lungs and kidneys.

## Competency 17: The Reproductive System.

Upon successful completion of this course, the student will be able understand the male and female reproductive systems by:

- 17.1 Naming the structure and functions of the male and female reproductive systems.
- 17.3 Comparing and contrasting spermatogenesis and oogenesis.
- 17.4 Explaining how hormones control the activities of the reproductive organs and discussing the role of hormones in the development of primary and secondary sexual characteristics.
- 17.5 Discussing the ovarian and menstrual cycles and explaining how they are related.
- 17.6 Describing the effects of aging on the reproductive systems of males and females.