



between anatomy, physiology and pathophysiology of body systems.

Method of measurement: Written tests and quizzes

**Learning Outcome 2: The student will be able to identify anatomical features and landmarks of all body systems.**

Performance Objectives/Methods of Measurement for this outcome.

1 The student will be able to state anatomical terms for the parts of the body.

Method of measurement: Written tests and labeling diagrams.

2 The student will be able to use proper terminology to describe body parts with respect to one another.

Method of measurement: Class participation, written tests and labeling diagrams.

**Learning Outcome 3: The student will be able to discuss basic chemical structures and their relationship to life functions in the human body.**

Performance Objectives/Methods of Measurement for this outcome.

1 The student will be able to describe the formation and purpose of chemical bonds.

Method of measurement: Written tests and class participation.

2 The student will be able to explain the roles of water, oxygen and carbon dioxide in the functioning of the human body.

Method of measurement: Written tests and class participation.

3 The student will be able to describe the structure and functions of carbohydrates, lipids and proteins.

Method of measurement: Written tests

4 The student will be able to describe the structures and function of DNA, RNA and ATP.

Method of measurement: Written tests.

**Learning Outcome 4: The student will be able to describe and explain physiology of all body systems.**

Performance Objectives/Methods of Measurement for this outcome.

1 The student will be able to describe what cells and tissues of each body system do and how they do it.

Method of measurement: Written tests.

2 The student will be able to discuss normal and abnormal structure and function of cells and tissues in each body system and explain how they affect other body systems.

Method of measurement: Written tests.

**Evaluation Ratio:**

Exams (multiple choice, short answer, matching, fill in the blank)	50%
Assignments	25%
Comprehensive Final Exam	25%

**SCANS - Competencies:** C-5, C-6      **Foundations:** F-1, F-5, F-6, F-10, F-11, F-12, F-13, F-14

**CAAHEP Standards:**

I.C. Anatomy and Physiology

1. Describe structural organization of the human body
2. Identify body systems
4. List major organs in each body system
6. Identify common pathology related to each body system
7. Analyze pathology as it relates to the interaction of body systems
8. Discuss implications for disease and disability when homeostasis is not maintained
10. Compare body structure and function of the human body across the life span

VII. Course requirements and grade computation.

A. College Requirements:

A written, comprehensive final examination, not to exceed two and one-half hours in length, shall be given at the end of each semester for each course at the regularly scheduled time. Any exceptions to these requirements must be approved by the appropriate dean. Other examinations are given at the discretion of the instructor.

A student who must be absent from a final examination should petition that instructor for permission to postpone the examination. **A student absent without permission from a final examination is graded "F."** Postponed examinations result in a grade of "I." The final exam must be taken within 120 calendar days from the end of the semester or the grade automatically becomes an "F." (San Antonio College Bulletin, Faculty Handbook - January 1995)

B. Departmental Requirement:

Successful completion of the course with a minimum score of 74%.

C. Instructor Requirements:

Grading Policy:

93-100 = A

85-92 = B

74-84 = C

73-65 = D

0-64 = F

Only two (2) make up tests will be allowed for unauthorized absences.

Materials Required: Scantron Forms # 882-ES

See individual instructor course outlines for attendance policies.

VIII. College Policies:

- A. San Antonio College does not discriminate on the basis of race, religion, color, national origin, sex, age, or disability with respect to access, employment programs or services.
- B. Students are urged not to bring children to either a class or a lab. Minors under the age of twelve (12) must not be left unattended on campus. College Academic Council - April, 1998
- C. ADA Statement: "As per Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, if accommodation is needed contact the Office of DisABILITY Support Services, CAC 124C, Phone: (210) 733-2347.
- D. A Rapid Response Team exists for the purpose of responding to emergencies. If you have a disability that will require assistance in the event of a building evacuation, notify Disability Support Services, Chance Academic Center 124C, Phone: (210) 733-2347.
- E. Academic Dishonesty: Students may be subject to disciplinary proceedings resulting in an academic penalty or disciplinary penalty for academic dishonesty. Academic Dishonesty includes, but is not limited to, cheating on a test, plagiarism and collusion. For additional information refer to the "Student Code of Conduct" in the San Antonio College Bulletin.
- F. Students are required to silence all electronic devices (e.g., pagers, cellular phones, etc.) when in classrooms, laboratories and the library. College Academic Council, 01/ 2000.
- G. San Antonio College Attendance Policy: Regular and punctual attendance at all classes and laboratories, day and/or evening is required. A student absent for any reason is responsible for all work missed. Both tardiness and early departure from class are forms of absenteeism. The instructor establishes the policy with regard to each. Absences of each student are recorded without exception. The counting of absences begins on the first day of class. A student absent the equivalent of two weeks of instruction in a 16-week semester may be dropped by the instructor. If a student is dropped from a class for excessive absences, the instructor will record a grade of "W" (withdraw). It is the student's responsibility to ensure that the withdrawals have been submitted.
- H. San Antonio College is a smoke free campus.
- I. ACCD DPS Emergency Phone Numbers:  
ACCD DPS Emergency Phone (210) 222-0911  
ACCD DPS General Phone (210) 208-8099  
ACCD DPS Weather Phone (210) 208-8189 (For information on college closures)
- J. Students must also abide by the policies, procedures, and rules set forth in the "Student Code of Conduct" and all other policies set forth in the San Antonio College Bulletin. . [www.accd.edu/sa/sacmain/schedule/SAC\\_Bulletin\\_07-08.pdf](http://www.accd.edu/sa/sacmain/schedule/SAC_Bulletin_07-08.pdf)

## COURSE LEARNING OUTCOMES AND PERFORMANCE OBJECTIVES

Upon completion of this course, the student will demonstrate competency with a minimum of 74% accuracy on written examinations and quizzes with multiple choice, matching, true/false and fill-in the blank questions.

### INTRODUCTION TO THE HUMAN BODY

- Define the terms anatomy and physiology
- List the levels of organization in the body
- Describe the 11 major organ systems
- Explain homeostasis
- Define the term anatomical position
- List common terms used for relative positions of the body
- Describe the 3 major planes of the body
- List anatomical terms for regions of the body

### BASIC CHEMISTRY

- Define the terms matter and element
- List the 4 elements that compose 96% of body weight
- Describe the 3 components of an atom
- Describe the role of electrons in the formation of chemical bonds
- Differentiate among ionic, covalent and hydrogen bonds
- Explain the differences between cations, anions and ions
- Describe the relationship of an electrolyte to an ion
- Explain the difference between a molecule and a compound
- List 5 reasons why water is essential to life
- Describe the term chemical reaction
- Differentiate between mechanical and chemical energy
- Explain the role of catalysts and enzymes
- Differentiate between an acid and a base
- Describe pH in terms of hydrogen ion concentration
- State an example of a mixture, solution, suspension, and colloidal suspension

### CELLS

- Label a diagram of the parts of a cell
- Describe the functions of the main organelles of the body
- Explain the role of the nucleus
- Identify the structure of the cell membrane
- Differentiate between active and passive transport
- Describe the active and passive movement of substances across the cell membrane
- Compare isotonic, hypotonic and hypertonic solutions
- Describe the 4 phases of mitosis
- Explain what is meant by cell differentiation

### CELL METABOLISM

- Define anabolism, catabolism, metabolism
- Explain the use of carbohydrates by the body

- Differentiate between aerobic and anaerobic metabolism of carbohydrates
- Explain the uses of lipids and proteins in the body
- Describe the structure of a nucleotide
- Describe the roles of DNA and RNA in protein synthesis
- Describe protein synthesis

#### TISSUES AND MEMBRANES

- Define disease and infection
- Describe bacteria by shape and staining characteristics
- List the characteristics of the different types of pathogens
- Define portals of entry and exit
- List common ways in which infections are spread
- Identify microbiological principles

#### INTEGUMENTARY SYSTEM AND BODY TEMPERATURE

- List the 4 basic types of tissues
- Describe the functions of epithelial, connective, muscle and nervous tissue
- Explain how epithelial tissue is classified
- Differentiate between exocrine and endocrine glands
- List the types of epithelial and connective tissue membranes
- Differentiate between mucous and serous membranes
- Describe the 2 layers of the skin
- Define stratum germinativum and stratum corneum
- List the 2 major functions of the subcutaneous layer
- List the factors that influence the color of the skin
- Describe the accessory structures of the skin: hair, nails, glands
- List 6 functions of the skin
- Describe how the skin helps regulate body temperature
- Explain 4 processes by which the body loses heat

#### SKELETAL SYSTEM

- List the functions of the skeletal system
- Describe the structure of a long bone
- Describe the roles of osteoblasts and osteoclasts
- List the bones of the axial and appendicular skeletons
- List important landmarks for selected bones of the skeleton
- List the main types and functions of joints

#### MUSCULAR SYSTEM

- Identify 3 types of muscle tissue
- Describe the structure of skeletal tissue
- Describe the sliding filament hypothesis of muscle contraction
- Describe the events at the myoneural (neuromuscular) junction
- Explain the role of ATP and calcium in muscle contraction
- Identify the sources of energy for muscle contraction
- Define: twitch, tetanus, and recruitment
- Trace the sequence of events from nerve stimulation to muscle contraction
- State the basis for naming muscles
- Identify the major muscles
- List the actions of the major muscles

#### NERVOUS SYSTEM: NERVOUS TISSUE AND BRAIN

- Define the 2 divisions of the nervous system

- List 3 general functions of the nervous system
- Compare the structure and function of the neuroglia and neuron
- Explain the function of the myelin sheath
- Define the 3 types of neurons
- Explain how a neuron transmits information
- Describe what happens at the synapse
- Describe the functions of the 4 major areas of the brain
- Describe the functions of the 4 lobes of the cerebrum
- Describe how the skull, meninges, CSF, and blood-brain barrier protect the CNS

#### NERVOUS SYSTEM: SPINAL CORD AND PERIPHERAL NERVES

- Describe the 3 functions of the spinal cord
- List 4 components of the reflex arc
- Describe the functions of the 12 pairs of cranial nerves
- Identify the classification of spinal nerves
- List the functions of the 3 major plexuses
- Explain the structure and function of the autonomic nervous system
- Compare the sympathetic and parasympathetic nervous system

#### SENSORY SYSTEM

- State the function of the sensory system
- Define the 5 types of sensory receptors
- Describe the 4 components of perception of a sensation
- Differentiate between general and special senses
- Describe the 5 general senses
- Describe 5 special senses
- Describe the visual accessory organs
- Describe the structures of the eye
- Explain the movement of the eyes
- Describe how the size of the pupils changes
- Describe the 3 divisions of the ear
- Describe the function of the parts of the ear involved in hearing
- Explain the role of the ear in maintaining equilibrium

#### ENDOCRINE SYSTEM

- List the functions of the endocrine system.
- Differentiate between protein hormones and steroid hormones.
- Explain negative feedback control for hormone levels.
- Describe the relationship of the hypothalamus to the anterior and posterior pituitary gland.
- Describe the structure and function of the pituitary gland.
- List the six major hormones secreted by the anterior pituitary gland.
- Describe the two major hormones of the posterior pituitary gland.
- Identify the major endocrine glands of the body.
- Describe the actions of the hormones secreted by the major endocrine glands.
- Explain the effects of hyposecretion and hypersecretion of the following hormones: insulin, growth hormone, thyroxine, cortisol, parathyroid hormone (PTH), and anti-diuretic hormone.

#### BLOOD

- Describe three functions of blood.

- Describe the composition of blood.
- Describe the three types of blood cells: erythrocytes, leukocytes, and thrombocytes.
- Explain the formation of blood cells.
- Explain the breakdown of red blood cells and the formation of bilirubin.
- Identify the steps of hemostasis.
- Describe the four blood types.
- Describe the Rh factor.

### HEART

- Describe the location of the heart.
- Name the three layers of the heart.
- Explain the function of the heart as two separate pumps.
- Identify the four chambers of the heart.
- Explain the functions of the four heart valves.
- Describe blood flow through the heart.
- List the vessels that supply blood to the heart.
- Identify the major components of the heart's conduction system.
- Describe the three stages of the cardiac cycle.
- Define heart rate, stroke volume, and cardiac output.
- List two ways in which stroke volume may be altered.

### BLOOD VESSELS AND CIRCULATION

- Describe the pulmonary and systemic circulations.
- Describe the structure and function of arteries, capillaries, and veins.
- List the three layers of tissue found in arteries and veins.
- Explain the functions of conductance, resistance, exchange, and capacitance vessels.
- List those major arteries of the systemic circulation that are branches of the ascending aorta, aortic arch, and descending aorta.
- List the major veins of the systemic circulation.
- Describe the following special circulations: blood supply to the head and brain and fetal blood flow.
- Explain the factors that determine blood pressure.
- List three factors that cause venous blood to flow back to the heart.
- Explain rapidly acting mechanisms that keep blood pressure within normal limits.
- Describe capillary exchange.

### LYMPHATIC SYSTEM

- List three functions of the lymphatic system.
- Describe the composition of lymph.
- Describe the flow path for lymph.
- Describe the four lymphoid organs: lymph nodes, tonsils, thymus gland, and spleen.
- State the location of the following lymph nodes: cervical nodes, axillary nodes, and inguinal nodes.
- Describe the function of the following lymph nodes: cervical nodes, axillary nodes, and inguinal nodes.

### IMMUNE SYSTEM

- Differentiate between specific and nonspecific immunity.
- Describe the process of phagocytosis.

- Explain the causes of the signs of inflammation: redness, heat, swelling, and pain.
- Explain the role of fever in fighting infection.
- Describe the relationship of antigens to specific immunity.
- Explain the role of T cells in cell-mediated immunity.
- Explain the role of B cells in antibody-mediated immunity.
- Describe the two main categories of immunity: genetic immunity and acquired immunity.
- Give examples of naturally and artificially acquired active and passive immunity.
- Summarize the process of an allergic reaction.

### RESPIRATORY SYSTEM

- Describe the structure and functions of the organs of the respiratory system.
- Trace the movement of air from the nostrils to the alveoli.
- Describe the role of pulmonary surfactant(s) in reducing surface tension.
- Explain the role of pressure in maintaining expanded lungs.
- Describe the relationship of Boyle's law to ventilation.
- Explain how respiratory muscles affect thoracic volume.
- List three conditions that make the alveoli well suited for the exchange of oxygen and carbon dioxide.
- Explain how respiratory gases diffuse.
- Describe how oxygen and carbon dioxide move to and from the lungs.
- List lung volumes and capacities.
- Describe common variations and abnormalities of breathing.
- Explain the neural and chemical control of respiration.

### DIGESTIVE SYSTEM

- List four functions of the digestive system. Describe the four layers of the digestive tract.
- List three functions of the peritoneal membranes.
- List, in sequence, the parts of the alimentary canal from the mouth to the anus.
- Describe the structure and functions of the organs of the digestive tract.
- Describe the structure and functions of the accessory organs of the digestive tract.
- List the nine functions of the liver.
- Explain the physiology of digestion and absorption.
- List the major enzymes involved in digestion.
- Describe the role of the bile in the digestion of fats.
- Describe five categories of nutrients.
- List six factors that affect metabolic rate.

### URINARY SYSTEM

- List four organs of excretion.
- Describe the major organs of the urinary system.
- Describe the location, structure, blood supply, and functions of the kidney.
- Explain the role of the nephron unit in the formation of urine.
- Explain the three processes involved in the formation of urine: filtration, reabsorption, and secretion.
- Describe the control of water and electrolytes through aldosterone;

antidiuretic hormone (ADH); atrial natriuretic factor (ANF); and parathyroid hormone (PTH).

- List the normal constituents of urine.
- Describe the structure and function of the ureter(s), urinary bladder, and urethra.

#### WATER, ELECTROLYTE, AND ACID-BASE BALANCE

- Describe the two fluid compartments: intracellular and extracellular.
- Describe the concept of intake and output.
- List factors that affect electrolyte balance.
- Describe the most common ions found in the intracellular and extracellular compartments.
- List three mechanisms that regulate pH in the body.
- Discuss acid-base imbalances: acidosis and alkalosis.

#### REPRODUCTIVE SYSTEMS

- List the structures and function of the male and female reproductive systems.
- Describe the structure and function of the testes.
- Describe the structure and function of the male genital ducts: epididymis, vas deferens, ejaculatory duct, and urethra.
- Describe the accessory glands that add secretions to the semen: seminal vesicles, prostate gland, and bulbourethral glands.
- Describe the hormonal control of male reproduction, including the effects of testosterone.
- Describe the structure and function of the ovaries, including the ovarian follicle, ovulation, and ovarian hormones.
- Describe the structure and function of the female genital tract: fallopian tubes, uterus, and vagina.
- Explain the hormonal control of the female reproductive cycle.

#### HUMAN DEVELOPMENT AND HEREDITY

- Describe the process of fertilization: when, where, and how it occurs.
- Describe the process of development: cleavage, growth, morphogenesis, and differentiation.
- Explain the three periods of prenatal development: early embryonic, embryonic, and fetal periods.
- State two functions of the placenta.
- Explain hormonal changes during pregnancy.



