

<u>BIO</u> <u>201</u> Prefix No.	<u>HUMAN ANATOMY AND PHYSIOLOGY I</u> Course Title	<u>BIO 103 or appropriate</u> <u>Placement Test Score</u> Prerequisite
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Credit Hours: 4 Contact Hours: Lecture 3 Lab 2

I. COURSE DESCRIPTION

This course is the first in a two-semester sequence that examines the structure (anatomy) and function (physiology) of the human body. Topics in BIO 201 include histology and the integumentary, skeletal, muscular and nervous systems. Dissection, histological studies and physiology experiments are featured in the required lab.

II. GENERAL COURSE COMPETENCIES

- A. The student will demonstrate knowledge of basic histology.
- B. The student will demonstrate knowledge of the detailed anatomy of each system studied.
- C. The students will demonstrate knowledge of the physiological concepts related to each system studied.
- D. The student will acquire an understanding of the principle of complementarity, as well as, an understanding of the concept of a wholistic organism functioning to maintain homeostasis.
- E. The student will become proficient in understanding the Latin/Greek origins of terminology that is consistently used in this particular discipline.

III. COURSE OBJECTIVES

Upon completion of Biology 201 the student should be able to demonstrate competency in the subject by doing the following:

- A. Histology
 1. Epithelial Tissue
 - a. Describe the general characteristics and functions of epithelial tissue.
 - b. Name and describe each of the different types of epithelia.
 - c. Give an example of where each type is located in the human body and describe its function in that location.
 - d. Microscopically identify each type of epithelium.

- e. Differentiate between endocrine and exocrine glands and multicellular and unicellular glands.
 - f. Describe the structure and function of the three epithelial membranes: cutaneous, mucous, and serous.
2. Connective Tissue
- a. Describe the general characteristics and functions of connective tissue including embryonic origin, the dominant cell type, and a description of the extracellular matrix.
 - b. Name and describe each of the different types of connective tissue.
 - c. Give an example of where each type is located in the human body and describe its function in that location.
 - d. Microscopically identify each type of connective tissue.
3. Muscle Tissue
- a. Describe the general characteristics and functions of muscle tissue.
 - b. Name and describe each of the three different types of muscle tissue.
 - c. Give an example of where each type is located in the human body and describe its function in that location.
 - d. Microscopically identify each type of muscle tissue.
4. Nervous Tissue
- a. Describe the general characteristics and function of nervous tissue.
 - b. Know the two types of cells associated with nervous tissue and their respective functions.
 - c. Know the anatomy of a neuron.
 - d. Give an example of where this tissue is located in the human body.
 - e. Microscopically identify nervous tissue.
5. Tissue Repair
- a. Distinguish between regeneration and fibrosis and when each process occurs.
 - b. Describe a classic inflammatory response.
 - c. Know the regenerative capacity of each major tissue type.

B. The Integumentary System

- 1. Define the functions of the integumentary system.
- 2. Know the components of the system.
- 3. Know the two main divisions of the integument, the dominant histology of each division, and be able to identify them microscopically.
- 4. Know the sub-divisions of the epidermis and the dermis.
- 5. Summarize the factors that determine skin color.

6. Describe the accessory organs associated with the skin (hair, nails, and cutaneous glands); know the anatomy and function of each of these organs.
7. Summarize the characteristics of the three major types of skin cancer.
8. Differentiate between first, second, and third degree burns.
9. Give examples of homeostatic interrelationships between the integumentary system and other body systems

C. Skeletal System and Articulations

1. Know the histology of compact and cancellous bone and be able to recognize each under the microscope.
2. Describe the chemical composition of bone.
3. Classify bones according to shape.
4. Describe the gross anatomy of a typical long bone and of a flat bone.
5. Define osteogenesis and be able to discuss both endochondral and intramembranous ossification.
6. List and describe five important functions of bone.
7. Distinguish between axial and appendicular divisions of the skeleton and name the components of each.
8. Name and identify the bones of the skull including important markings designated by the instructor.
9. Describe the structure of the vertebral column, lists its components, and describe its curvatures.
10. Know the anatomy of a typical vertebra and be able to distinguish between cervical, thoracic, and lumbar vertebrae.
11. Name and describe the bones of the bony thorax.
12. Identify the bones forming the pectoral girdle and identify important markings designated by the instructor.
13. Name the bones of the upper limb and identify important markings designated by the instructor.
14. Name the bones forming the pelvic girdle and be able to distinguish between a male and female pelvis.
15. Identify the bones of the lower limb and the important markings designated by the instructor.
16. Define fontanel and indicate their significance.
17. Discuss bone growth and remodeling in terms of hormonal controls and Wolff's law.
18. Know the common types of fractures and explain the process of bone repair.
19. Define articulation/joint.
20. Name the three types of joints and be able to classify any joint structurally and functionally.
21. Know the generalized anatomy of a synovial joint and name the six types of synovial joints.
22. Describe the types of movements allowed by synovial joints.

23. Give examples of homeostatic interrelationships between the skeletal system and other body systems.

D. Skeletal Musculature

1. Know the histology and location in the human body of the three types of muscle tissue.
2. State the four functional characteristics of muscle tissue.
3. Define the four functions of muscles as organs.
4. Describe the anatomy of a skeletal muscle from the cellular level up to the organ level including connective tissue wrappings.
5. Know the microscopic anatomy of a myofiber and the anatomy of the sarcomere.
6. Define and describe the events at the neuromuscular junction.
7. Define and discuss the events of an action potential.
8. Describe the contraction of a skeletal muscle in terms of the sliding filament theory of a muscle contraction.
9. Define muscle twitch and describe the three phases of a twitch.
10. Explain graded contractions of skeletal muscles using the following terms: motor unit, wave summation, tetanus, refractory period, fatigue, recruitment, threshold stimulus, maximal stimulus, treppe.
11. Differentiate between isometric and isotonic contractions.
12. Describe three ways ATP is produced for muscle contraction.
13. Define oxygen debt and muscle fatigue.
14. Name and give the structural and functional characteristics of the three types of skeletal muscle fibers.
15. Compare and contrast the contractile mechanisms of skeletal and smooth muscle.
16. Describe the function of prime movers, antagonists, synergist, and fixators in normal muscle function.
17. Name and identify selected muscles designated by the instructor and state the origin, insertion and action of each of these muscles.
18. Give examples of homeostatic interrelationships between the muscular system and other body systems.

E. NERVOUS SYSTEM

1. List the functions of the nervous system and explain the structural and functional divisions of this system.
2. Know the detailed anatomy of a neuron and name and describe the four types of neuroglial cells and the function of each.
3. Classify neurons structurally and functionally.
4. Describe the resting membrane potential of a neuron and explain how action potentials are generated and propagated along a neuron.
5. Distinguish between absolute and relative refractory periods.
6. Define saltatory conduction.

7. Define synapse and distinguish between electrical and chemical synapses.
8. Distinguish between excitatory and inhibitory postsynaptic potentials.
9. Define neurotransmitter and name several classes of neurotransmitters.
10. Discuss the embryonic development of the brain.
11. Know the gross anatomy of the human brain (internal and external).
12. Know the gross anatomy of the spinal cord (internal and external).
13. List the major spinal cord tracts and classify each as motor or sensory
14. Define peripheral nervous system and list its components.
15. Distinguish between sensory, motor, and mixed nerves.
16. Name and identify the 12 pair of cranial nerves and describe the function of each.
17. Name and identify the major spinal nerve plexuses and the major nerves arising from each.
18. Define autonomic nervous system.
19. Compare and contrast the general structure and function of the parasympathetic and sympathetic divisions of the ANS.
20. Define cholinergic and adrenergic fibers and list the different types of cholinergic and adrenergic receptors.
21. Specifically describe the effects of the effects of sympathetic and parasympathetic innervation on the following organs: heart, blood vessels, gastrointestinal tract, lungs, adrenal medulla, and external genitalia.
22. Describe the structure and function of the human eye.
23. Describe the structure and function of the human ear.
24. Give examples of homeostatic interrelationships between the nervous system and other body systems.

IV. CLASS ACTIVITIES

- A. Lecture
- B. Laboratory
- C. Multimedia supported exercises and activities
- D. Parallel readings

V. CRITERIA FOR EVALUATION

A student will have demonstrated competency in the course if he/she accumulated a total of 70% of the possible points from the following methods of evaluation; the student may pass the course with 60% accuracy in these same evaluations.

- A. Scheduled lecture examinations.
- B. Laboratory examinations
- C. Semester final examination