**Bossier Parish Community College**
**Master Syllabus**

**Course Prefix and Number:** BLGY 230 **Credits Hours:** 3

**Course Title:** Human Anatomy and Physiology I

**Course Prerequisites:** Reading competency

**Textbook:** Amerman, Human Anatomy & Physiology, 2nd edition, Pearson, (ISBN: 9780134788074)

**Course Description:**
A study of the anatomy and physiology of the human body. Topics include cells, tissues, integumentary, skeletal, muscular, and nervous systems.

**Learning Outcomes:**

At the end of this course, the student will

A. Utilize correct terminology to describe basic anatomic and physiologic principles, including homeostasis;
B. Utilize knowledge of basic chemistry and the structure and function of cells;
C. Apply knowledge of the structure of the integumentary system to understand the physiology of the skin and accessory structures;
D. Identify the components of the skeletal system and joints;
E. Apply knowledge of the mechanisms of muscle contraction and location of major muscles to understand the physiology of the muscular system;
F. Integrate knowledge of the physiology of nerve tissue to the anatomy and physiology of the organs of the nervous system.
G. Demonstrate reading competency of anatomy and physiology.

To achieve learning outcomes, the student will

1. Describe the science of anatomy. (A)
2. Describe the science of physiology. (A)
3. Explain how the study of form and function are related. (A)
4. Describe the levels of organization of the human body. (A)
5. Describe the anatomic position and its importance in the study of anatomy. (A)
6. Describe the anatomic sections and planes though the body. (A)
7. Define the different anatomic directional terms. (A)
8. Identify the major regions of the body, using proper anatomic terminology. (A)
9. Describe the body cavities and their subdivisions. (A)
10. Compare the terms used to subdivide the abdominopelvic region into nine regions or four quadrants. (A)

11. Define glands. (A)
12. Distinguish between endocrine and exocrine glands. (A)
13. Compare the 4 types of membranes and the general structure of each. (A)
14. Define and recognize the components of the homeostatic system. (A)
15. Define negative feedback. (A)
16. Explain how homeostatic mechanisms regulated by negative feedback detect and respond to environmental changes. (A)
17. Define the following chemical terms: atom, element, molecule, cation, anion, ionic bond, covalent bond, polar molecule, nonpolar molecule, hydrogen bond, hydrophilic and hydrophobic. (B)
18. Describe the difference between an acid and a base. (B)
19. Define pH and state the relative pH values of acids and bases. (B)
20. Explain the term neutralization and describe how the neutralization of acids and bases occurs. (B)
21. Describe the action of a buffer. (B)
22. Compare dehydration and hydrolysis reactions. (B)
23. Describe the general characteristics of lipids. (B)
24. Name the major classes of lipids and the physiological importance of each class. (B)
25. Describe the distinguishing characteristics of carbohydrates. (B)
26. Explain the relationship between glucose and glycogen. (B)
27. Describe the general structure of a nucleic acid. (B)
28. Describe the structure of DNA and RNA. (B)
29. Describe the general structure and function of ATP. (B)
30. List the general functions of proteins. (B)
31. Describe the general structure of proteins. (B)
32. Distinguish between the four structural hierarchy levels of proteins. (B)
33. Explain what is meant by denaturation and list the factors that can cause it. (B)
34. Explain ATP cycling. (B)
35. Describe the general function of enzymes. (B)
36. Describe the key structural components of enzymes. (B)
37. Identify places in the body where enzymes are found. (B)
38. Explain the steps by which an enzyme catalyzes a reaction. (B)
39. Describe cofactors and their roles in reactions. (B)
40. Explain the role of coenzymes in human physiology. (B)
41. Describe the naming conventions for enzymes. (B)
42. Describe the effects of enzyme and substrate concentration, temperature, and pH on enzyme function. (B)
43. Describe how competitive and noncompetitive inhibitors control enzyme action. (B)

44. Describe the concept of a metabolic pathway. (B)
45. Explain the role of negative feedback in enzyme regulation. (B)
46. Describe the range in size and shape of human cells. (B)
47. Describe the three main structural features of a cell. (B)
48. Explain the general functions that cells must perform. (B)
49. Distinguish between the cytoplasmic components. (B)
50. List the components of the plasma membrane, and explain the major actions of each component. (B)
51. List the organelles of the cell and describe the structure and major functions of each. (B)
52. Distinguish between cilia, flagella, and microvilli. (B)
53. Compare and contrast the structure and function of the three major types of membrane junctions. (B)
54. Describe the structure of the nucleus including the nuclear envelope and nucleolus. (B)
55. Describe the relationship between DNA, chromatin, and genes. (B)
56. Explain why the nucleus is considered the cell's control center. (B)
57. Describe the general concepts of diffusion. (B)
58. Distinguish between simple diffusion and facilitated diffusion. (B)
59. Describe the diffusion of substances across the plasma membrane. (B)
60. Define osmosis and osmotic pressure. (B)
61. Describe tonicity and the effects of solutions on cells. (B)
62. Compare and contrast primary and secondary active transport. (B)
63. Describe the processes of vesicular transport. (B)
64. Describe membrane potential and the ions involved. (B,E,F)
65. Define action potential. (B,E,F)
66. Explain how cells communicate through direct contact. (B,E,F)
67. Describe the basic process of protein synthesis. (B)
68. Describe the structural difference between chromatin and chromosomes, and note when each is present in the cell. (B)
69. Summarize the phases of the cell cycle, including mitosis, and the activities that occur in each phase. (B)
70. Explain the function of cytokinesis. (B)
71. Name the four principle tissue types and the general characteristics of each group. (B)
72. Describe the five layers of the epidermis. (C)
73. Explain what causes differences in skin color. (C)
74. Characterize the two layers of the dermis. (C)
75. Describe how dermal blood vessels function in temperature regulation. (C)
76. List the structure and function of the subcutaneous layer. (C)

77. Differentiate between the two types of sweat glands. (C)
78. Describe the structure and function of sebaceous glands. (C)
79. Describe the major functions of the integument. (C)
80. Describe the primary functions of bones. (D)
81. List the four groups of bone by shape. (D)
82. Describe the anatomy of a typical long bone. (D)
83. Compare and contrast the structure and function of bone marrow. (D)
84. Name the types of bone cells and their function. (B,D)
85. Compare the location and structure of compact and spongy bone tissue. (D)
86. Compare the structure of the three types of cartilage. (D)
87. Describe the basic processes of bone growth and development. (D)
88. Describe the process of bone remodeling. (D)
89. Describe the hormonal regulation of blood calcium. (B,D)
90. Describe the name, location, and number of bones of the skull. (D)
91. Identify the bones of the axial and appendicular skeletons and the major bone markings and features of each. (D)
92. Identify the bony structures that form the major articulations of the body. (D)
93. Describe the difference in the structure and movement allowed by fibrous, cartilaginous, and synovial joints. (D)
94. Describe the structural features of a synovial joint. (D)
95. Compare the six types of synovial joints. (D)
96. Describe the movements of synovial joints. (D)
97. Compare the three types of muscle tissue. (B,E)
98. Explain the general functions of skeletal muscles. (E)
99. Describe the gross anatomy of skeletal muscles. (E)
100. Describe the sarcolemma, T tubules and sarcoplasmic reticulum of a skeletal muscle cell. (B,E)
101. Distinguish between thick and thin filaments. (B,E)
102. Describe the structure of a sarcomere. (B,E)
103. Define neuromuscular junction and motor unit. (B,E)
104. Name the neurotransmitter released at the neuromuscular junction and the effect of the neurotransmitter on the sarcolemma. (B,E)
105. List the steps involved in excitation-contraction coupling. (B,E)
106. Summarize the events that occur in the sarcomere during contraction. (B,E)
107. Describe the process of muscle relaxation. (B,E)
108. Compare and contrast the origin and insertion of a skeletal muscle. (E)
109. Differentiate between agonists (prime mover), antagonists, and synergists. (E)
110. Give the name, location, and primary function of the major muscles of the body. (E)

111. Give the location of major connective tissue structures associated with the muscular system. (E)
112. Describe the three general functions of the nervous system. (F)
113. Identify the structural components of the PNS and CNS. (F)
114. Name the three basic anatomical features common to most neurons. (B,F)
115. Identify and describe the structures unique to neurons. (B,F)
116. Classify neurons based on structure (multipolar, bipolar, unipolar, anaxonic). (B,F)
117. Define a synapse. (B,F)
118. Describe the essential function of a chemical synapse. (B,F)
119. List the general function of representative glial cells (astrocytes, ependymal cells, microgial cells, oligodendrocytes, and neurolemmocytes). (B,F)
120. Define myelination, and describe the structure and function of the myelin sheath. (F)
121. Identify the major membrane proteins and how they relate to membrane potential. (B, F)
122. Describe how resting membrane potential is established and maintained. (B,F)
123. Describe the voltage changes and movement of ions associated with depolarization, repolarization, and hyperpolarization of a neuron. (B,F)
124. Describe the process of production of a post-synaptic potential of a neuron. (B,F)
125. Compare EPSPs and IPSPs. (B,F)
126. Describe the process of summation at the axon hillock/ initial segment and the resulting action potential. (B,F)
127. Explain the electrical changes that occur in the axon. (B,F)
128. Define refractory period. (B,F)
129. Describe the process of propagation of an action potential (nerve signal) down the axon. (B,F)
130. Explain why action potentials are “all or none”. (B,F)
131. Compare action potentials and graded potentials. (B,F)
132. Compare and contrast continuous conduction and saltatory conduction. (B,F)
133. Describe the events that occur when a propagated action potential reaches the synaptic knob. (B,F)
134. State the factors that affect the velocity of transmission of a nerve signal. (B,F)
135. Compare and contrast continuous and saltatory conduction. (B,F)
136. Identify the four classes of neurotransmitters and give examples of their actions. (B,F)
137. Explain the two ways in which neurotransmitters are removed from the synaptic cleft. (B,F)
138. Describe the structure of a nerve. (B,F)

139. Classify nerves based on structure and function. (F)
140. Describe the general anatomical features of the brain. (F)
141. Compare and contrast the structure and location of the three meninges, and list the spaces found between the meninges. (F)
142. Describe the anatomy of the brain ventricles. (F)
143. Describe the composition and three major functions of cerebrospinal fluid. (F)
144. Describe the formation, circulation, and reabsorption of CSF. (F)
145. Describe the components that form the blood brain barrier. (F)
146. Explain how the BBB protects the brain. (F)
147. Identify the regions and structure of the brain and major functions of each part. (F)
148. List the names and major functions of each of the 12 cranial nerves. (F)
149. Describe the gross and cross-sectional anatomy of the spinal cord. (F)
150. Describe the locations of the spinal meninges and their associated spaces. (F)
151. Describe how the spinal cord serves as a conduction pathway. (F)
152. Describe the basic structure and function of spinal reflexes. (F)
153. Describe the typical components of a spinal nerve. (F)
154. Describe the system of naming spinal nerves. (F)
155. Define dermatome. (F)
156. Describe the basic structure of a nerve plexus and name the four major plexuses. (F)
157. Describe the accessory structures of the eye, and list their functions. (F)
158. Describe the structure and function of the components of the eye and ear. (F)
159. Answer questions using information gained through reading on a specific biological topic. (G)

**Course Requirements:**

To earn a grade of "C" or higher the student must earn 70% of the total points for the course and meet all of the following course requirements.

- Minimum average of 60% on unit tests
- Minimum of 50% on the comprehensive final

**Course Grading Scale:**

A- 90% or more of total possible points and meets all course requirements
B- 80% or more of total possible points and meets all course requirements
C- 70% or more of total possible points and meets all course requirements
D- 60% or more of total possible points and meets all course requirements
F- Less than 60% of total possible points or fails to meet all course requirements

**Attendance Policy**: The college attendance policy is available at http://www.bpcc.edu/catalog/current/academicpolicies.html

**Nondiscrimination Statement**

Bossier Parish Community College does not discriminate on the basis of race, color, national origin, gender, age, religion, qualified disability, marital status, veteran's status, or sexual orientation in admission to its programs, services, or activities, in access to them, in treatment of individuals, or in any aspect of its operations. Bossier Parish Community College does not discriminate in its hiring or employment practices.

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Reviewed by T. B.-S., April 2020