Bossier Parish Community College
Master Syllabus

Course Prefix and Number: BLGY 231 **Credits Hours:** 3

Course Title: Human Anatomy and Physiology II

Course Prerequisites: BLGY 230

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 autonomic nervous, endocrine, circulatory, respiratory, lymphatic, digestive, urinary, and reproductive systems.

Learning Outcomes:

At the end of this course, the student will

A. apply knowledge of the endocrine and autonomic nervous systems to explain control of the internal environment;
B. utilize knowledge of the blood, cardiovascular system, and lymphatic system to explain how tissues of the body receive the materials necessary to maintain homeostasis;
C. relate the structure of the respiratory organs to the ability of the system to accomplish gas exchange;
D. explain how the urinary system maintains homeostatic balance within the tissues;
E. relate the structure and function of the digestive organs to the nutrient needs of the tissues and the use of nutrients to produce ATP;
F. explain how the organs of the male and female reproductive system function in reproduction; and
G. integrate knowledge of the anatomy and physiology of the human body.

To achieve learning outcomes, the student will

1. List the similarities and differences between the somatic and autonomic nervous systems. (A)
2. Compare the abundance of the major ions between the inside of the cell and the interstitial spaces. (G)
3. Describe the general structure and function of sympathetic and parasympathetic divisions of the autonomic nervous system. (A)
4. Compare the origin of sympathetic versus parasympathetic nerves. (A)

5. Compare the location of ganglia in the sympathetic and parasympathetic nervous systems. (A)
6. Compare the neurotransmitters and receptors of the sympathetic and parasympathetic nervous systems. (A)
7. Describe the nature of autonomic tone and its effects. (A)
8. Explain what is meant by dual innervation. (A)
9. Describe the effects of autonomic nervous stimulation on selected body systems. (A)
10. Discuss how autonomic reflexes help maintain homeostasis. (A)
11. Describe some major types of autonomic reflexes. (A)
12. Describe how the CNS controls the autonomic nervous system. (A)
13. Compare and contrast the actions of the endocrine system and the nervous system to control body functions. (A)
14. Identify the characteristics of endocrine glands and endocrine tissues. (A)
15. Explain the three mechanisms for regulating secretion of hormones. (A)
16. Name the three structural categories of hormones. (A)
17. Distinguish between lipid-soluble and water-soluble hormones. (A)
18. Describe the mechanisms of transport of hormones within the blood. (A)
19. Describe the two major factors that affect the concentration of a circulating hormone. (A)
20. Describe how lipid-soluble hormones reach their target cell receptors and the type of cellular changes they initiate. (A)
21. Describe how water-soluble hormones induce cellular changes in their target cells. (A)
22. Define up-regulation and down-regulation. (A)
23. Describe the enzymatic control of nutrient levels in the blood. (A)
24. Describe the anatomy, location, and structure of the major endocrine glands. (A)
25. Describe the major hormones secreted by the major endocrine glands and identify their target cells. (A)
26. Describe the relationship of the pituitary gland and the hypothalamus. (A)
27. Describe how the hypothalamus controls the release of the hormones in the posterior pituitary. (A)
28. Identify the primary types of pancreatic islet cells. (A)
29. Compare the effects of insulin and glucagon on blood glucose concentration. (A)
30. Describe the general functions and characteristics of blood. (B)
31. Name the three formed elements of blood and compare their relative abundance. (B)
32. Describe the composition and function of blood plasma. (B)

33. Identify the types of plasma proteins and explain the general function of each. (B)
34. Describe the over-all process of hemopoiesis. (B)
35. Describe the structure and function of erythrocytes. (B)
36. Compare and contrast the different blood types and their importance when transfusing blood. (B)
37. Explain the main functions of leukocytes. (B)
38. Distinguish between granulocytes and agranulocytes, and compare and contrast the various types. (B)
39. Explain the structure and function of platelets. (B)
40. Describe vascular spasm. (B)
41. Describe the events of the coagulation pathway. (B)
42. Describe the general function of the cardiovascular system. (B)
43. Differentiate between the three primary types of blood vessels. (B)
44. Describe the general structure and function of the heart. (B)
45. Compare and contrast pulmonary circulation and systemic circulation. (B)
46. Trace blood flow through both the pulmonary and systemic circulations. (B)
47. Describe the location and position of the heart in the thoracic cavity. (B)
48. Describe the structural components of the pericardium. (B)
49. Describe the function of the pericardium and the purpose of the serous fluid within the pericardial cavity. (B)
50. Compare the superficial features of the anterior and posterior aspects of the heart. (B)
51. Name the three layers of the heart wall and the tissue components of each. (B)
52. Characterize the four chambers of the heart and their function. (B)
53. Compare and contrast the structure and function of the heart valves. (B)
54. Describe the general structure of cardiac muscle. (B)
55. Explain the intercellular structure of cardiac muscle tissue. (B)
56. Discuss how cardiac muscle tissue meets its energy needs. (B)
57. Describe the location and function of the fibrous skeleton. (B)
58. Identify the coronary arteries, and describe the specific areas of the heart supplied by their major branches. (B)
59. Describe blood flow through the coronary arteries. (B)
60. Identify the function of the major coronary veins. (B)
61. Compare and contrast sympathetic and parasympathetic innervation of the heart. (B)
62. Define autorhythmicity. (B)
63. Describe the steps for SA node cells to spontaneously depolarize and serve as the pacemaker cells. (B)

64. Describe the spread of the action potential through the heart's conduction system. (B)
65. List the electrical events of an action potential that occur at the sarcolemma. (B)
66. Briefly summarize the mechanical events of cardiac muscle contraction. (B)
67. Define the refractory period for cardiac muscle. (B)
68. Explain the significance of the plateau phase of cardiac muscle physiology. (B)
69. Identify the components of the ECG recording. (B)
70. List the five events of the cardiac cycle. (B)
71. Define cardiac output. (B)
72. Define chronotropic agents and describe how they affect heart rate. (B)
73. Describe the three variables that influence stroke volume. (B)
74. Describe the layers that make up the walls of blood vessels. (B)
75. Compare the structure of arteries, capillaries, and veins. (B)
76. Describe the flow of blood through a capillary bed. (B)
77. Describe the process of capillary exchange. (B)
78. Compare and contrast hydrostatic and osmotic pressure in the capillaries. (B)
79. Explain how a tissue autoregulates local blood flow based on metabolic need. (B)
80. Define blood pressure and compare blood pressure in arteries, capillaries, and veins. (B)
81. Calculate pulse pressure and mean arterial pressure. (B)
82. Describe the factors that affect total peripheral resistance. (B)
83. Describe the autonomic components associated with regulating blood pressure through short-term mechanisms. (B)
84. Explain the autonomic reflexes that alter blood pressure. (B)
85. Describe the hormones that regulate blood pressure. (B)
86. Explain the renin-angiotensin system and its influence on blood pressure. (B)
87. Trace the pathways of vessels from the right ventricle to the lungs and back to the left ventricle. (B)
88. List the major arteries that carry blood from the left ventricle of the heart to the major areas of the body. (B)
89. Name the major veins that return blood from the systemic circulation to the heart. (B)
90. Describe the hepatic portal system. (B)
91. State the major functions of the lymphatic system. (B)
92. Describe lymph and its contents. (B)
93. Discuss the location and anatomic structure of lymphatic capillaries. (B)
94. Explain the mechanisms that move lymph through lymphatic vessels, trunks, and ducts. (B)

95. Describe the regions that are drained by the right lymphatic duct and the thoracic duct. (B)
96. Describe lymphatic tissue. (B)
97. Name the major lymphatic organs and the structure, location, and function of each. (B)
98. Describe the structure and function of lymph nodes. (B)
99. State the functions of the respiratory system. (C)
100. Describe the divisions of the respiratory system. (C)
101. Describe the lining of the respiratory tract. (C)
102. Describe the structure and function of the nasal cavity, paranasal sinuses, and pharynx. (C)
103. Describe the structure and function of the larynx, trachea, and bronchial tree. (C)
104. Name the cells of the alveoli and the function of each. (C)
105. Describe the structure of the respiratory membrane. (C)
106. Describe the location and general structure of the lungs. (C)
107. Describe the innervation of lung structures by the autonomic nervous system. (C)
108. Describe the pleural membranes and the pleural cavity. (C)
109. List the steps in pulmonary ventilation. (C)
110. Describe the relationship between pressure and volume during pulmonary ventilation. (C)
111. Name the muscles associated with pulmonary ventilation. (C)
112. Describe how pulmonary ventilation is controlled by the central nervous system. (C)
113. Describe alveolar gas exchange and the partial pressure gradients responsible. (C)
114. Differentiate between alveolar and systemic gas exchange. (C)
115. Describe the transport of oxygen by the blood. (C)
116. Describe the three ways that carbon dioxide is transported by the blood. (C)
117. Describe the conversion of carbon dioxide and bicarbonate. (C)
118. Explain the oxygen-hemoglobin saturation curve. (C)
119. Identify the structures that compose the urinary system and provide a description of the general function of each. (D)
120. Describe the location and structure of the kidneys. (D)
121. Describe the structure of the nephron. (D)
122. Describe blood flow through the kidneys. (D)
123. Trace the fluid from its formation in the renal corpuscle until it exits the body through the urethra. (D)

124. Compare and contrast the processes of glomerular filtration, reabsorption, and secretion. (D)
125. Define glomerular filtration rate and the factors that influence it. (D)
126. Describe reabsorption and secretion of selected substance including nutrients, ions, nitrogenous waste, and drugs. (D)
127. Describe the regulation of urine concentration to regulate water balance in the body. (D)
128. Describe the structure and function of the ureters, urinary bladder, and urethra. (D)
129. Describe the micturition reflex. (D)
130. Describe acid-base balance within the body. (D)
131. Describe the role of buffers in acid-base balance. (D)
132. Discuss the role of the kidneys and respiratory system in maintaining acid-base balance. (D)
133. List and describe the major functions of the digestive system. (E)
134. List the organs belonging to the alimentary canal and describe the functions of each. (E)
135. List the accessory organs of the digestive system and describe the functions of each. (E)
136. Describe the tissues that make up the four layers of the gastrointestinal tract walls. (E)
137. Describe the structure and location of the serous membranes associated with the abdominal cavity. (E)
138. Explain nervous and endocrine control of digestion. (E)
139. Describe the digestion and absorption of proteins, carbohydrates, and lipids. (E)
140. Describe the roles of HCl and pepsin in digestion. (E)
141. List the organs and structures of the digestive system that function in the process of emulsification. (E)
142. Write the formula for the oxidation of glucose. (E)
143. Outline the process of glycolysis and give the products of the pathway. (E)
144. Describe the intermediate stage of aerobic cellular respiration. (E)
145. Summarize the citric acid cycle. (E)
146. Describe the role of the electron transport system in the production of ATP. (E)
147. Compare aerobic and anaerobic cellular respiration. (E)
148. Describe the anatomy and physiology of the male and female reproductive system. (F)
149. Compare meiosis and mitosis. (F)
150. List the major sex hormones and the general functions of each. (F)
151. Answer questions that require critical thinking. (G)

152. Complete a satisfactory review of scientific literature by searching for journal articles online and writing a summary of a journal article. (A,B,C,D,E,F,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 of 60% average 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

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