

SYLLABUS

BIOLOGY 252. Human Anatomy and Physiology I

4 Cr. (3+2P)

CATALOG DESCRIPTION:

The organization of cells and tissues and their homeostatic processes. Physical and chemical operation of organs and systems of the human body, including the integument, skeletal, muscular, and nervous systems.

SEMESTER OFFERED: Fall, Spring, Summer

PREREQUISITES: BIOL 121 or high school biology within the last five years. CHEM 110, or equivalent, and HITP 110 are strongly recommended.

Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, students will

Learn: *actively and independently acquire, apply and adapt skills and knowledge to develop expertise and a broader understanding of the world as lifelong learners.*

Think: *think analytically and creatively to explore ideas, make connections, draw conclusions, and solve problems.*

Communicate: *exchange ideas and information with clarity and originality in multiple contexts.*

Integrate: *demonstrate proficiency in the use of technologies in the broadest sense related to their field of study.*

Act: *act purposefully, reflectively, and respectfully in diverse and complex environments.*

GENERAL LEARNING OBJECTIVES:

1. Acquire a functional understanding of the relationship between the anatomical structures of the human body and their physiological function.
2. Demonstrate understanding of the interrelationships among the various organ systems and their contribution to the health of the individual.
3. Demonstrate understanding of how knowledge of organ system dysfunction provides a basis for understanding the disease process.

SPECIFIC LEARNING OUTCOMES

Upon completion of the course, the student will be able to:

1. List and recognize the various organizational levels of the human body
2. Discuss the relationship between anatomy and physiology
3. Explain the concept of homeostatic regulation as a basis for maintaining health
4. Diagram and discuss the role of negative and positive feedback as homeostatic mechanisms
5. Locate the major anatomical directions, regions, planes, cavities and membranes of the human body
6. List the 11 body systems, their major organs and functions.
7. Review the basic chemical reactions of living things
8. Review the main classes of organic compounds in the human body.
9. Review cell membrane structure and transmembrane transport systems.
10. Review the basic cell organelles and their function
11. Review protein synthesis.
12. Name the classes of tissue and relate their cellular composition and arrangement to function
13. Describe the location and function of serous, mucous, epithelial, and synovial membranes
14. Describe the tissue response to injury
15. List the physiological roles of the integumentary system
16. Compare structure and functional roles of the epidermis, dermis, and hypodermis
17. Describe the accessory structures and glands of the skin
18. List the physiological roles of osseous tissue
19. Explain the differences in function and structure of compact and spongy bone
20. Describe bone formation, growth, remodeling and repair
21. Compare the roles and regulation of osteoprogenitor cells, osteocytes, osteoclasts and osteoblasts.
22. Describe the hormones involved in calcium and phosphorus regulation and their effect on bones.
23. Name and locate the major bones of the axial and appendicular skeleton
24. Define the basic bone terminology including landmark terminology.
25. Know the major landmarks and identifying characteristics of the major bones
26. Describe the classifications of articulations and indicate examples of each
27. Name and give examples of the types of joint movements
28. Describe the arrangements of bones, ligaments, and muscles at the shoulder, elbow, hip, and knee joints
29. Describe the structure of skeletal muscle tissue and cells.
30. Identify the origin, insertion, and actions of selected skeletal muscles
31. Define the terms used in naming muscles.
32. Understand the roles of prime mover, antagonist, synergist and fixator muscles.
33. Describe the organization of the sarcomere. Explain the sliding filament mechanism of muscle contraction

34. Explain the relationship between muscle length and tension in skeletal muscles.
35. Describe the 3 lever systems in the body and give examples of each.
36. Discuss the physiology of gross muscle contraction, including twitch, tetany, isometric and isotonic contractions.
37. Discuss aerobic and anaerobic ATP generation in skeletal muscles
38. Compare the structure and function of smooth, cardiac, and skeletal muscle tissues
39. Describe the special characteristics of cardiac and smooth muscle cell anatomy and function/abilities.
40. Describe the organization of the nervous system.
41. List the major cellular components of the nervous system
42. Describe the roles of anatomical locations of myelinated and unmyelinated neurons
43. Know the structure and function of the four classes of neuroglial cells
44. Understand the ionic basis of the resting, graded, and action potential
45. Describe the action potential in terms of altered membrane permeability and ionic currents
46. Compare action and local potentials.
47. Describe the effects of altered ion concentrations on excitable membranes.
48. Identify the structural components of a chemical synapse and indicate the sequential occurrence of events during synaptic transmission
49. Describe the integrative function of chemical synapses in information processing
50. Name and classify the major neurotransmitters
51. Locate and name the gross structures of the spinal cord
52. Diagram the divisions and branches of a spinal nerve.
53. Name the major peripheral nerve plexus. Be able to describe which spinal nerves contribute to each plexus and which major peripheral nerves arise from each plexus.
54. Describe and draw the major components of the reflex arc
55. Diagram and discuss the role of the stretch, tendon, withdrawal, and crossed-extensor reflex
56. Locate and name the major regions and anatomical landmarks of the brain
57. Locate and relate the general physiological roles of the cerebrum, diencephalon, cerebellum, midbrain, pons, and medulla
58. Describe the roles of the thalamus and hypothalamus.
59. Describe the formation, flow, and reabsorption of cerebral spinal fluid
60. Locate and name the three meningeal layers covering the brain and spinal cord
61. Locate, name, and discuss the roles associated with the four major cerebral lobes
62. Name the cerebral nuclei and describe their role of motor activity
63. Name the major structures and functions of the limbic system
64. Locate, name and indicate the major sensory and/or motor function of each cranial nerves
65. Diagram and discuss the role of the dorsal column and anterolateral sensory tracts
66. Diagram and discuss the motor function of the major descending motor tracts.
67. Describe the major neural structures associated with memory and consciousness
68. Compare and contrast the autonomic and somatic motor systems
69. Compare the general anatomy and functions of the parasympathetic and sympathetic branches of the autonomic nervous system

- 70. Describe the neurotransmitters and receptors of the sympathetic and parasympathetic divisions
- 71. Identify the major general sensory receptors and the modalities they encode
- 72. Locate, name, and describe the function of the external and internal structures of the eye
- 73. Describe the roles of the cornea, lens, and ciliary body in focusing an image on the retina
- 74. Discuss the process of sensory detection for taste and smell.
- 75. Describe the physiology of photon detection by rods and cones.
- 76. Describe the outer, middle, and inner ear structures and their roles in sound transduction
- 77. Describe the structures and central pathways associated with the sense of equilibrium
- 78. Trace the projection pathway from the peripheral receptors to the cortex for all special sense modalities.

Syllabus developed by _____ Date: _____

Syllabus reviewed by _____ Date: _____