

COURSE OUTLINE
BIOL-106
Basic Anatomy and Physiology
4 Credits

HOWARD COMMUNITY COLLEGE

Description

This course is designed for students who need one semester of science which provides a learning sequence of the human body systems, fluid-electrolyte balance and tissues. The integrated approach to studying biological, chemical and physics relationships is stressed. Special emphasis, however, is given to the physics concepts applicable to human physiology. The laboratory program will develop an understanding of the interrelationships of the human body systems. Prerequisite: PHYS-101 or BIOL-101 or BIOL-107. (3 hours lecture, 3 hours lab)

Overall Course Objectives

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

1. Discuss the structure and function of eukaryotic cells and discuss how cells are organized to form epithelial tissues and connective tissues.
2. Discuss the functions and structures of the integumentary system.
3. Discuss the functions of the skeletal system, and identify the major bones of the axial and appendicular skeleton.
4. Describe the anatomy of a long bone.
5. Define the term articulation and discuss the classification of joints.
6. Using examples, discuss simple machines; and using principles of IMA and AMA, examine their efficiency.
7. Solve problems relating to equilibrium and torques.
8. Discuss the functions of the muscular system and identify major skeletal muscle, and their origin, insertion and action.
9. Discuss the structure, function and location of skeletal muscle, cardiac muscle and smooth muscle.
10. Describe the anatomy of a skeletal muscle fiber and discuss the events that lead to its stimulation and contraction.
11. Define the following terms that describe the response of muscle to stimuli: twitch, graded contractions, isometric contractions, isotonic contraction, tone and fatigue.
12. Identify classes of levers and apply lever principles to proper body mechanics.
13. Discuss the principles of electromyogram, electrocautery and electrosurgery.
14. Discuss the functions of the nervous system, and identify its anatomical and physiological subdivisions.
15. Discuss the histology of the nervous system and describe the process that neurons use to respond to and to transmit electrical impulses.
16. Discuss the structures of the brain and the spinal cord and their functions.
17. Identify the functions of the autonomic nervous system and its subdivisions and identify the effect that each subdivision has on selected target organs.

18. Discuss the following instrumentation: electromyogram, iontophoresis, electrical effects in bone, electroencephalography.
19. Discuss the structures of the eye and the ear and their functions.
20. Describe the anatomical and physiological relationship between the nervous system and the endocrine system and for selected endocrine glands, identify the hormones they secrete, their targets and their major effects.
21. Discuss the functions of the cardiovascular system and its components.
22. Describe the composition of blood and its role in hemostasis and ABO and Rh blood groups.
23. Identify the structures of the heart and the pericardium, the circulatory pathway of blood through the heart, the cardiac conduction system and the principles of defibrillation and electrocardiography.
24. Describe pressure changes, valve action and heart sounds during the cardiac cycle.
25. Define mean arterial pressure and discuss how it is maintained.
26. Identify the functions of the lymphatic system and discuss its components.
27. Identify major human arteries and veins of systemic and pulmonary circulation.
28. Discuss the structures of the respiratory system and their role in accomplishing ventilation and transportation of oxygen and carbon dioxide.
29. Discuss the structures of the digestive system and their functions.
30. Discuss the wave and particle nature of light, defining quantization and solving problems using the wave equation; and discuss the medical applications of radio frequency, infrared, ultraviolet, x-radiation, lasers, ST scan and NMR scans.
31. Discuss the structures of the urinary system and the reproductive system and their functions.

Major Topics

- I. Organization of the Human Body and the Integument
- II. The Skeletal System
- III. The Muscular System
- IV. The Nervous System
- V. Special Senses
- VI. The Endocrine System
- VII. Circulatory Systems
- VIII. The Respiratory System
- IX. The Digestive System
- X. The Urinary System
- XI. The Reproductive System

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of lecture exams, lecture and lab quizzes and lab practicals.

Other Course Information

This course is a Science elective and an Arts and Sciences elective.