

COURSE OUTLINE
BIOL-108
Human Anatomy and Physiology
6 Credits

HOWARD COMMUNITY COLLEGE

Description

BIOL-108 is a one-semester course designed for students who wish to undertake an in-depth study of the anatomy and physiology of human body systems. Topics in the course include basic chemistry, cell structure and function, histology, integumentary system, skeletal system, muscular system, nervous system, endocrine system, cardiovascular system, immunity, respiratory system, digestive system, urinary system, fluids and electrolytes and reproductive system. Students will examine each body system on a microscopic and a gross level. (6 hours weekly)

Overall Course Objectives

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

1. Define anatomy and physiology and discuss the methods used to study them. Discuss how physiology is regulated.
2. Define and apply directional terms, regional terms and terms related to planes, cavities, levels of structural complexity and membranes of the body.
3. Discuss the structure of atoms and molecules and describe the forces that hold them together. Identify the types of chemical reactions that occur in the body and the factors that influence their rate.
4. Define acid and base, pH and explain the role of buffers in maintaining the pH of body fluids.
5. Describe the structure, functions and location of proteins, carbohydrates, nucleic acids and lipids that are present in biological systems.
6. Identify the properties characteristic of cells and discuss the structure, function and location of the following subcellular components: plasma membrane, cytoplasm, ribosomes, endoplasmic reticulum, lysosomes, peroxisomes, golgi apparatus, nucleus, nucleolus and cytoskeletal elements.
7. Define tissue and discuss the structure, function and location of epithelial, connective, muscle and nerve tissue.
8. Discuss the structure, function, location and physiologic mechanisms of the integumentary system and its components.
9. Discuss the structures, functions, location and physiologic mechanisms of the skeletal system and its components.
10. Classify any joint into its proper functional and structural category, and using proper terminology, identify the range of motions possible at diarthrotic joints.
11. Discuss the structure, functions, location and physiologic mechanisms of the muscular system and its components.
12. Identify the origin, insertion and action of skeletal muscles.
13. Discuss the structure, functions, location and physiologic mechanisms of the central nervous system and the peripheral nervous system and their components.
14. Discuss the structure, functions, location and physiologic mechanisms of the organs of special senses.
15. Identify the major endocrine glands, the hormones that they secrete and discuss the effects of these hormones in the body.
16. Discuss the composition, physical characteristics and functions of the blood, the structure and function of the formed elements, the mechanisms of hematopoiesis and hemostasis and the basis for ABO and Rh blood groups and transfusion reactions.

17. Discuss the function, structures and location of the heart.
18. Describe the conduction system of the heart, electrocardiography, the cardiac cycle and define cardiac output, stroke volume and heart rate. Discuss the factors that are involved in the regulation of cardiac output.
19. Identify the major arteries and veins of systemic circulation, pulmonary circulation, fetal circulation, hepatic-portal circulation and cerebral circulation.
20. Discuss the histology of elastic arteries, muscular arteries, arterioles, capillaries, venules and veins and discuss the function of each type of vessel.
21. Define blood flow, blood pressure, mean arterial pressure, resistance, systolic pressure, diastole pressure and pulse pressure, identify relationship between them and discuss their regulation.
22. Outline the factors that are involved in capillary dynamics, explain their clinical significance and apply each to clinical situations.
23. Discuss the functions of the lymphatic system and the structures that comprise it.
24. Discuss the non-specific mechanisms and immune mechanisms of the body.
25. Discuss the functions, location, structure and physiologic mechanisms of the respiratory system and its components.
26. Discuss the functions, structures, location and physiologic mechanisms of the digestive system and its components.
27. Describe the mechanical and chemical digestion and absorption of carbohydrates, lipids and proteins.
28. Discuss the structure, location, functions and physiologic mechanisms of the urinary system and its components.
29. Discuss the location, functions and regulation of water and sodium, potassium, chloride, magnesium and calcium in body fluids.
30. Discuss the role of buffer, the respiratory system and the urinary system in the regulation of the pH of body fluids and distinguish between acidosis and alkalosis.
31. Discuss the structure, functions and locations of the reproductive system and its components.
32. Discuss the processes of spermatogenesis, oogenesis, the ovarian cycle, the uterine cycle and their regulation.

Major Topics

- I. Introduction to Cellular Chemistry and Biology
- II. Histology and the Integumentary System
- III. The Musculoskeletal System
- IV. The Nervous System and Special Senses
- V. The Endocrine System
- VI. Circulatory Systems – Cardiovascular and Lymphatic
- VII. Immunity
- VIII. The Respiratory System
- IX. The Digestive System
- X. The Urinary System
- XI. Fluid and Electrolyte Balance
- XII. 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 quizzes, exams and assignments. This course includes a comprehensive final exam.

Other Course Information

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