

COURSE OUTLINE

Anatomy and Physiology

Course Description

BI 240. Anatomy and Physiology. 5 hours credit. This course will enable the student to develop an understanding of the principles in structure and function of the human body systems. This course is an intermediate study designed primarily for pre-professional students in health-related fields. The student will study basic chemistry, cells, tissues, and these body systems: integumentary, lymphatic, cardiovascular, respiratory, urinary, digestive, reproductive, skeletal, muscular, nervous and endocrine. The student will participate in three hours of lecture and four hours of laboratory per week. Highly recommended BI 105 and AH 201 with a C or better.

Course Relevance

The principles learned in this course will provide the student with the foundational skills and knowledge for a career in healthcare and related fields such as athletic training, pharmacy, etc. The principles learned in this course are relevant in understanding the structures and functions of the human body for personal health.

Required Materials

Saladin, K. S. (2009). *Anatomy and physiology: the unity of form and function* (5th ed.)
Dubuque, IA, McGraw-Hill

Learning Outcomes

The intention is for the student to be able to:

1. Demonstrate an understanding of the importance of homeostasis in regulation of human health.
2. Apply concepts of the form and function relationship.
3. Identify structures of the human body.
4. Describe understanding of the interactions among the systems of the human body.

Learning PACT Skills that will be DEVELOPED and/or documented in this course

Through involvement in this course, the student will develop ability in the following PACT skill area(s):

Analytical Thinking Skills

1. Critical thinking
 - Through the application of concepts to new situations, students will develop critical thinking skills.

Major Summative Assessment Task(s)

These learning outcome(s) and the Learning PACT skill(s) will be demonstrated by:

1. Summarizing the key points from a journal article then analyzing the data and authoritativeness of the sources.

Course Content

- I. Skills/Competencies – Actions that are essential to achieve the course outcomes:
 - A. Identify structures and their functions on models, slides and specimens
 - B. Describe the relationship between processes of various systems
- II. Theme - Key recurring concepts that run throughout this course:
 - A. Molecular basis of life processes
 - A. Cellular basis of physiological processes
 - B. Homeostasis and feedback mechanisms
 - C. Connection between structure and function
- III. Issues - Key areas of conflict that must be understood in order to achieve the intended outcomes:
 - A. Balance between the reductionism (molecular/cellular/mechanical) view point and emergent properties as level of complexity increases
 - B. Appropriate use of models/simulations versus live organisms for use in the laboratory
 - C. Using technology to supplement learning activities
- IV. Concepts – Key concepts that must be understood to address the issues:
 - A. Relationships between structure and function at the cellular, tissue, organ and system levels
 - B. Underlying chemical and physical basis of all physiological processes
 - C. Connections between various organs and processes within the body

Learning Units

- I. Homeostasis
 - A. Negative feedback mechanisms
 - B. Positive feedback mechanisms
 - C. Molecular basis of living processes
- II. Biochemistry
 - A. Molecules
 - B. Chemical bonds
 - C. Acids and bases
 - D. Electrolytes
 - E. Buffering systems
- III. Cell
 - A. Cell membrane
 - B. Cell transport
 - C. Cytoplasm
 - D. Nucleus
 - E. Protein synthesis
 - F. Cell division
- IV. Tissues
 - A. Epithelial
 - B. Connective

- C. Muscle
- D. Nervous

V. Integument

- A. Functions
- B. Skin color
- C. Tissues of the skin
- D. Burns
- E. Skin cancer

VI. Metabolism

- A. Oxidation and reduction reactions
- B. Aerobic cellular respiration
- C. Anaerobic cellular respiration
- D. ATP/ADP cycle

VII. Skeletal system

- A. Bone tissues
- B. Long bone structure
- C. Ossification
- D. Articulations
- E. Identification of bones and features

VIII. Muscular system

- A. Microscopic structure of muscle cells
- B. Muscle contraction
- C. Oxygen and energy sources
- D. Types of muscle contractions
- E. Identification of muscles and their actions

IX. Digestive system

- A. Organs of the digestive system
- B. Mechanical digestion
- C. Chemical digestion and absorption

X. Urinary system

- A. Organs of the urinary system
- B. Glomerular filtration
- C. Tubular reabsorption
- D. Tubular secretion
- E. Fluid balance
- F. Regulation of blood pressure

XI. Respiratory system

- A. Organs of the respiratory system
- B. Ventilation
- C. Regulation of gas exchanges

D. Gas Transport in the blood

XII. Nervous system

- A. Subdivisions and functions of the nervous system
- B. Cells of the nervous system
- C. Brain, cranial nerves and cerebrospinal fluid
- D. Spinal cord
- E. Spinal nerves
- F. Neural reflex arc
- G. Autonomic nervous system
- H. Senses (optional)

XIII. Cardiovascular and lymphatic systems

- A. Blood
- B. Heart tissues
- C. Cardiac conduction system and cardiac cycle
- D. Lymph organs
- E. Identification of blood vessels and heart structures
- F. Regulation of blood pressure

XIV. Endocrine system

- A. Homeostasis of glucose levels.
- B. Hormonal control of human reproduction.
- C. Hormonal control of water and electrolyte balance.
- D. Hormonal control of metabolism.
- E. Hormonal mode of action in the cell

XV. Male reproductive system

- A. Testes and secondary organs
- B. Spermatogenesis
- C. Hormonal control of male reproductive system

XVI. Female reproductive system

- A. Ovary and secondary organs
- B. Oogenesis
- C. Hormonal control of female reproductive system

Learning Activities

Learning activities will be assigned to assist the student with mastery of course concepts, practice of critical thinking skills applied to new situations and study guide exercises. Independent and collaborative activities will be assigned inside and outside of the class. Examples of activities include: quizzes, homework assignments, exams, presentations, lab exams, lab demonstrations.

Grade Determination

The student will be graded on learning activities and assignment tasks. Grade

determinants may include the following: quizzes, exams, lab reports, lab exercises, written and oral reports and other methods of evaluation employed at the discretion of the instructor.